GE
Intelligent Platforms

2011 Military & Aerospace

product selection guide

imagination at work

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SPC EDWARD A. GARIBAY

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There is no such thing as a “minor glitch” in a military and aerospace computing or communications system.

The mission-criticality of the hardware, software and support programs we provide to contractors for ground, air, sea, unmanned vehicles and command and control stations is unquestioned. Starting with cost- and time-saving commercial off-the-shelf (COTS) technologies based on open architectures and standards, our products are engineered to ensure deployment-ready technology with the appropriate level of ruggedization and size, weight, and power for the design parameters at hand.

GE Intelligent Platforms has a proven track record as a subsystem supplier to major military and aerospace contractors. We have earned the reputation of being able to deliver subsystems that in some cases have clocked more than two decades of failure-free service, yet being agile enough to develop technologies for the most forward-thinking military and aerospace platforms. The military and aerospace arena is a major core focus of our business, and we invest heavily in developing new ruggedized computing and communications products that leverage COTS technologies.

We also draw upon a corporate culture with a long track record in military and aerospace research and development as part of one of the world’s largest and most stable corporations. GE has more than 100 years of experience supplying technology to the defense industry, including having developed the first jet engine for military use. Various divisions of the company subsequently developed numerous subsystems for military and aerospace contractors.

»PRODUCTS

GE Intelligent Platforms carries forward that legacy with COTS products that have been chosen for high-profile applications in every type of military and aerospace program, including manned and unmanned applications for air-, ground- and sea-based platforms.

While our standard products often provide the perfect technology solution, we also offer the ability to modify those products per customer-specific specifications. In other instances, fully custom products are developed from the ground up. All products, whether standard, semi-custom or fully custom, are manufactured using Six Sigma quality assurance methodologies.

GE Intelligent Platforms makes single board computers based on a variety of form factors, processors, clock speeds, memory configurations, I/O and operating systems. Our single board computers can be designed to varying levels of ruggedization and with several cooling options including conduction cooling. We are also able to supply a range of accessories and expansion cards for video, storage and network connectivity.

Signal processing is a critical element in military and aerospace platforms, and GE Intelligent Platforms has products to assist in virtually every type of application. Our product lineup includes multiprocessor single board computers and FPGA-based computing products for digital signal processing, acceleration and compression.

Our extensive array of communications and networking products includes LAN/Ethernet, Reflective Memory, storage, packet processing, switches/backplanes and both data- and control-plane processors. GE is also a leader in AdvancedTCA and AdvancedMC components.

We also build a variety of standard computers that can be customized with our broad selection of single board computers, carrier cards, PMCs and enclosures. Engineering development units can be provided so that customers can perform application development, and we also offer the services of our impressive in-house testing facilities. Our flat panel PC-based computer systems and monitors are engineered to withstand harsh military and aerospace environments.

»SUPPORT

We work closely with our customers to design embedded computing or communications hardware or software solutions that meet the technology, form factor, weight and power requirements of the platform.

We are committed to excellence in all of our products and services. All of our products are designed for high performance and unfaltering reliability, and are manufactured with a commitment to near-zero defect benchmarks. Our Centers for Excellence, global distribution and local support centers provide individualized customer support worldwide. We also offer comprehensive online technical support tools that include sample programs, free software upgrades and product documentation. Registered users are afforded the opportunity to search our knowledge base for specific technical information. We also offer customers the ability to access all other divisions under the GE umbrella, including world-renowned GE Research.

Our value-add continues with an extensive selection of high-level application programming interface libraries that greatly facilitate application development. Support is provided for a variety of Microsoft® Windows® operating systems as well as Linux®, VxWorks®, INTEGRITY®, Solaris®, LynxOS®, LabVIEW®, LabVIEW Real-Time®, LabWindows/CVI® and other operating environments.

Our customer focus can continue for many years past the initial product shipment. GE Intelligent Platforms offers an exemplary Product Lifecycle Management (PLM) program that begins in the design stage and follows the customer's program to lifecycle completion. Along the way, our PLM specialists maintain close contact with the COTS technology vendors to ensure that our military and aerospace customers are never left without viable options as mainstream technologies evolve.

CAPABILITIES

Whether on the ground, in the air or on the seas, GE Intelligent Platforms has military and aerospace platforms covered with commercial off-the-shelf (COTS) computing systems specifically tailored to the unique needs of that arena.

GE understands the need for subsystem components that leverage technology advances in the marketplace as well as the economies of scale that come along with the use of commercial products. We also understand the need for off-the-shelf availability and ease of development for the fastest possible platform time-to-market.

COTS technology also provides a major advantage by reducing overall program risk. GE designs and qualifies its products toward the platform specifications using only proven technologies. Whether for a ground-up design project or technology insertion, our products are designed to meet all technical requirements without the program risks that might otherwise be encountered.

GE can fully appreciate the harsh environments in which many of our products are called upon to perform. And we know how valuable every square inch, every ounce and every watt are in most every military and aerospace platform. For that reason, we design ruggedized products that provide the appropriate level of technology for the application in form factors that provide the lowest possible size, weight and power footprint.

Most importantly, we know what is riding on every product we make working just the way it should, year after year, without fail. GE is proud to have provided critical technological solutions for such high-visibility military and aerospace programs as the MQ-8B Fire Scout unmanned aerial vehicle, M1A2 Abrams tank, and M2A2 Bradley Medical Vehicle. Through our highly regarded Product Lifecycle Management program, we design our products around the lifecycle requirements of the platform. In some cases, we have achieved as much as two decades of component service without failure.

The following section provides highlights of certain facets of GE Intelligent Platforms' capabilities for the design, production, and lifecycle management of military and aerospace computing and communications hardware and software. We look forward to providing the COTS-based design and support expertise needed to help achieve success in your next military and aerospace program.

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GROUND VEHICLE SYSTEMS

Ground-based military assets must flawlessly perform under all conditions, whether extreme hot or cold, punishing shock and vibration, humidity or blowing dust. In addition, the technology systems employed must be easily upgradable to include the latest COTS technology with fast requalification turnaround.

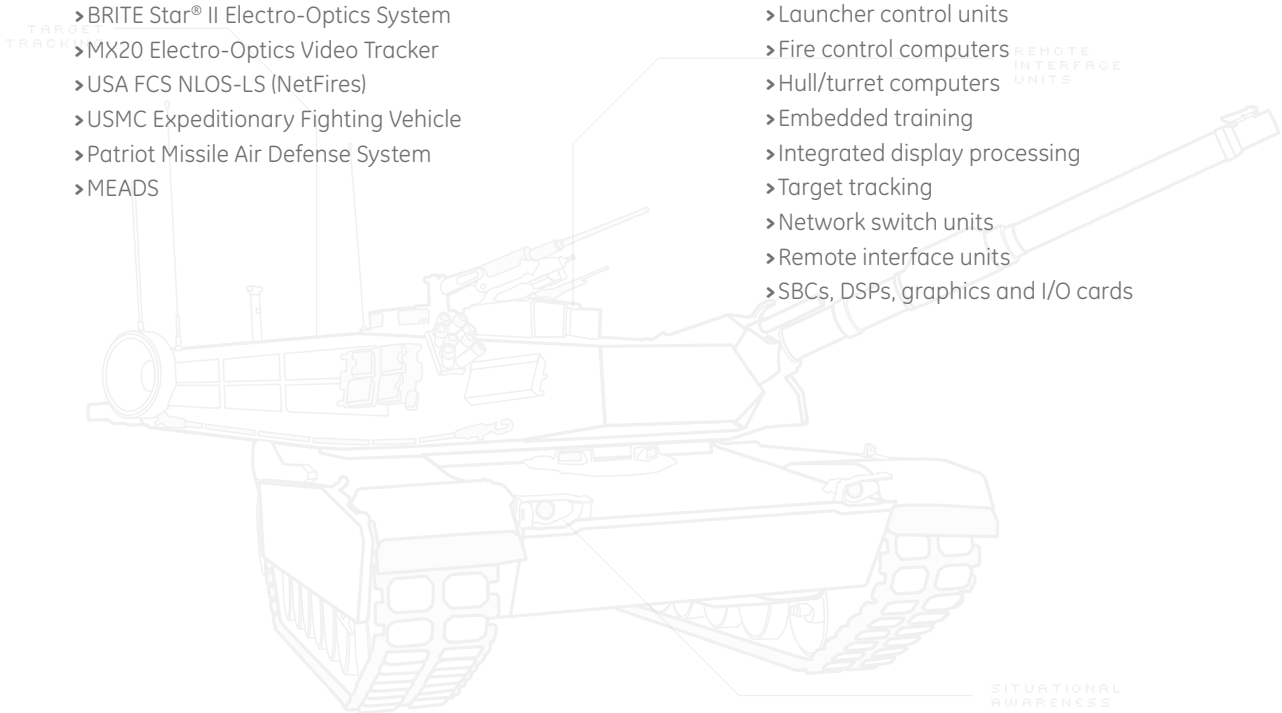
GE Intelligent Platforms has decades of experience in providing just such rugged systems and modules to leading contractors for ground vehicle systems. Our rugged systems have been used in numerous high-profile ground vehicle programs, including:

- M1A2 Abrams tank
- MLRS
- HIMARS
- Pedestal Mount Stinger System
- M2A2 Bradley Medical Vehicle
- Centurion Land-Based Phalanx System
- BRITE Star® II Electro-Optics System
- MX20 Electro-Optics Video Tracker
- USA FCS NLOS-LS (NetFires)
- USMC Expeditionary Fighting Vehicle
- Patriot Missile Air Defense System
- MEADS

In each application, we deploy our proven design strategy that provides the highest degree of technological performance throughout the lifecycle of the customer's program. Wherever possible, our designs provide for upgrades of the processor and memory types and speeds without changes to the physical or electrical characteristics of the board. This "plug-and-play" technology upgrade capability minimizes requalification delays. In addition, our Board Support Packages provide a stable software interface between applications and the underlying hardware, thus minimizing application software revisions after upgrades.

GE Intelligent Platforms rugged systems and modules are currently being used for a wide range of ground vehicle applications, including:

- Situational awareness
- Launcher control units
- Fire control computers
- Hull/turret computers
- Embedded training
- Integrated display processing
- Target tracking
- Network switch units
- Remote interface units
- SBCs, DSPs, graphics and I/O cards



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AIRBORNE SYSTEMS

Thirty-thousand feet up is no place for a systems failure. Because of that, leading contractors for decades have turned to GE Intelligent Platforms for mission-critical computing and communications systems components. Our rugged systems are up to the task under any type of harsh environment, whether it be high altitude, extreme hot or cold, dust, humidity, vibration or shock.

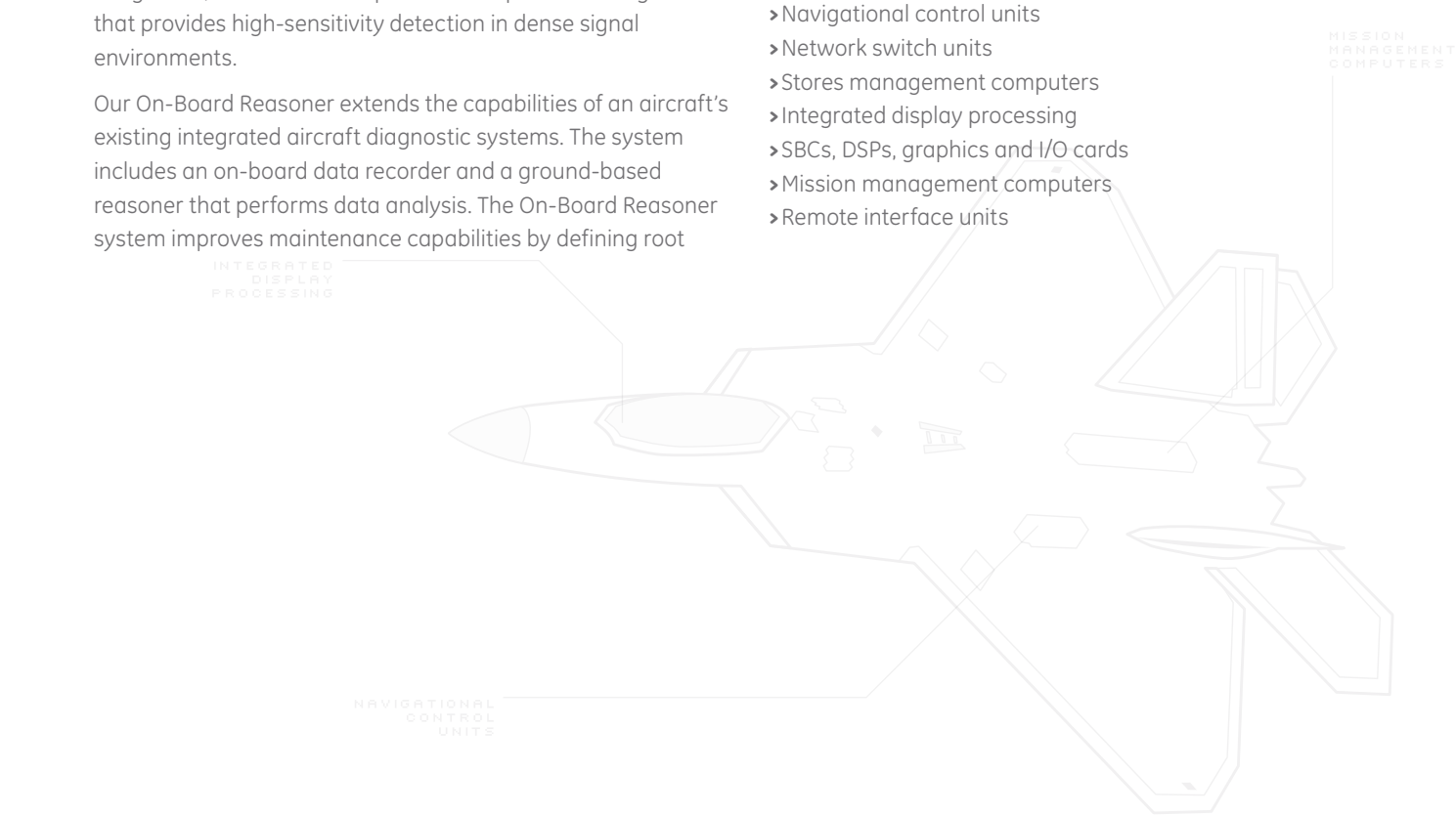
GE provides rugged technology applications for every type of aerospace platform. We developed the world's first all-digital radar warning receiver (RWR), the ALR-69A(V). This tactical RWR facilitates suppression of enemy air defenses, cross-platform integration, and enhanced spectral and spatial coverage that provides high-sensitivity detection in dense signal environments.

Our On-Board Reasoner extends the capabilities of an aircraft's existing integrated aircraft diagnostic systems. The system includes an on-board data recorder and a ground-based reasoner that performs data analysis. The On-Board Reasoner system improves maintenance capabilities by defining root causes, identifying false alarms, and prioritizing maintenance scheduling. Much of the analysis can be conducted in real time so that flight crews can be advised when an emergency situation exists and when they are experiencing a false alarm.

Another aerospace offering from GE is Automatic Image Matching (AIM) that aligns images taken at different times and positions to aid navigation and target detection.

Other military aerospace applications of GE Intelligent Platforms technologies include:

- Flight management computers
- IFF controllers
- Navigational control units
- Network switch units
- Stores management computers
- Integrated display processing
- SBCs, DSPs, graphics and I/O cards
- Mission management computers
- Remote interface units



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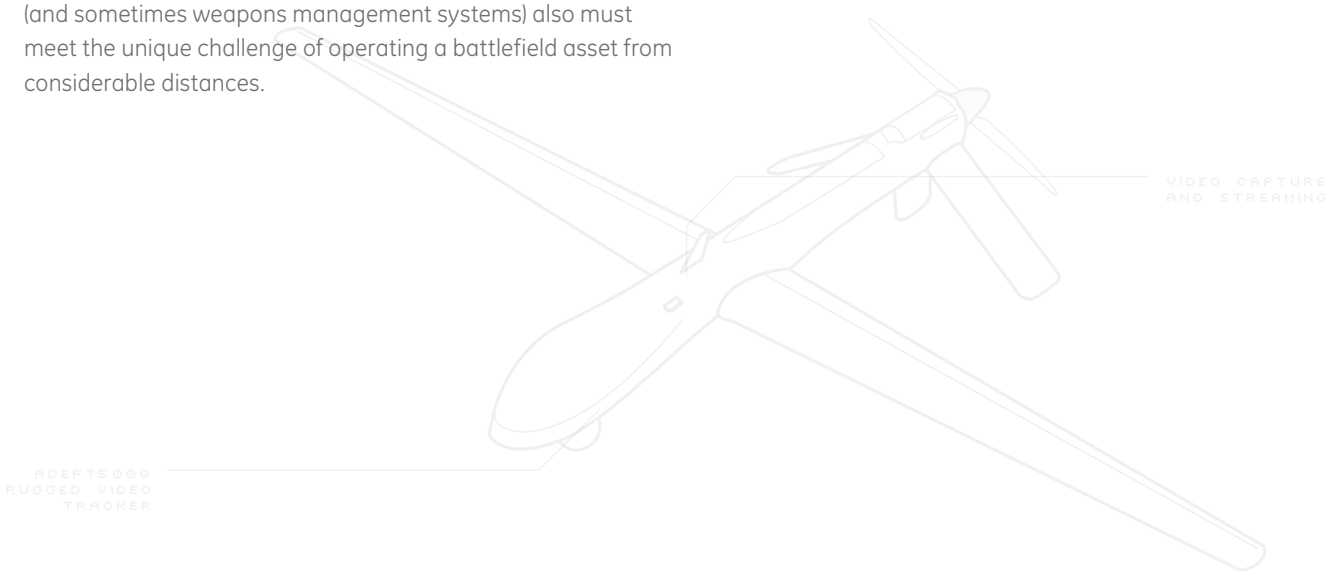
UAV

GE Intelligent Platforms has been a leading provider of embedded computing technologies for unmanned aerial vehicles (UAVs) since development of this paradigm-shifting new form of military aircraft. UAVs are now revolutionizing how aerial intelligence is gathered and in some cases even how the enemy is engaged. The US Army, Air Force and Navy have all made substantial commitments to even greater use of UAV technology in the future as a way to limit risks to warfighters, conduct missions under conditions not possible by manned flight platforms, and even lower capital and operating costs for battlefield deployments.

The technology requirements of unmanned platforms present unique challenges to contractors. Video capture and streaming capabilities are of major importance both to control the aircraft and obtain meaningful observation of potential objects of interest on the ground. The capture, processing and transmission of enormous volumes of data must be accomplished seamlessly and in real-time with components that incorporate leading-edge size, weight and power advantages. Flight management and control systems (and sometimes weapons management systems) also must meet the unique challenge of operating a battlefield asset from considerable distances.

Many unique GE products have helped launch the UAV paradigm, and continue to move it forward to maturity. Our video capture and processing technology has been deployed in UAVs such as the US Navy Fire Scout as well as a DARPA-funded demonstration of in-flight refueling of a UAV. Video tracking systems from GE such as our ADEPT5000 rugged video tracker have successfully overcome the challenges of data clutter from non-targets, multiple target tracking, and obscuration and decoy attempts to avoid detection. Acquiring the data necessary to perform these surveillance activities is the role of a myriad of sensor technologies, and onboard analog-to-digital data converters must be able to manage that data with near-zero latency.

The latest and greatest technology is of little use if subsystems fail to integrate in an efficient manner. GE Intelligent Platforms' rigorous subsystem integration and testing programs free contractors and system integrators from the time- and capital-intensive certification of subsystems, and thus help to quickly move UAV concepts out of the design studio and onto the battlefield.



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SEA SYSTEMS

GE Intelligent Platforms' broad range of rugged systems products give prime contractors just the right level of ruggedization necessary for the environmental conditions involved with sea-going operations. Whether in the protective environment of a control room, the sea-sprayed deck or the high altitudes of an unmanned aerial vehicle, GE can provide a system that will provide the needed combination of longevity and upgradability that sea-going applications demand.

Given that sea systems often must remain in place for decades, we strive to develop products that can survive numerous technology upgrades with a minimum of physical or electrical reconfiguration and recertification. As much as possible, GE designs in the ability to swap out COTS processors or memory chips without changing the board's physical dimensions or electrical characteristics.

GE has been selected by contractors to provide systems hardware and software for numerous applications throughout the spectrum of sea operations:

- ADCAP (Raytheon)
- SQQ-89 (Lockheed Martin)
- ALFS/LAMPS (Raytheon)
- LFAS (DRA)
- NSSN-SIM/STIM (DSR)
- P3 upgrade (Boeing)
- P8 MMA (Boeing)
- Fire Scout (Northrop Grumman)
- AN/BPS-16 (Northrop Grumman)

With decades of experience in sea systems, chances are very good that GE already has strong experience in a given technology challenge. We are a leading supplier of sonar technology, with installations on more than 400 vessels around the world including the US Navy's Virginia class submarines. Our use of COTS technology has enabled us to leverage new multi-core processors and serial switched fabrics for a range of applications such as radar systems. We have developed a wide selection of communications technologies necessary for sea operations, including Software Defined radio transceivers and standards-based systems, switches and I/O modules. GE's ballistic predictors provide full ballistic prediction to increase the probability of a first-round hit, while our Dynamic Gun Alignment system affords an automated, video-based solution for sea-going weapon system alignment.

Sea systems applications that have been provided by GE Intelligent Platforms include:

- Shipboard network control
- Sensor processing
- Target detection and tracking
- Communications and IFF
- Fire control computers
- Integrated display units

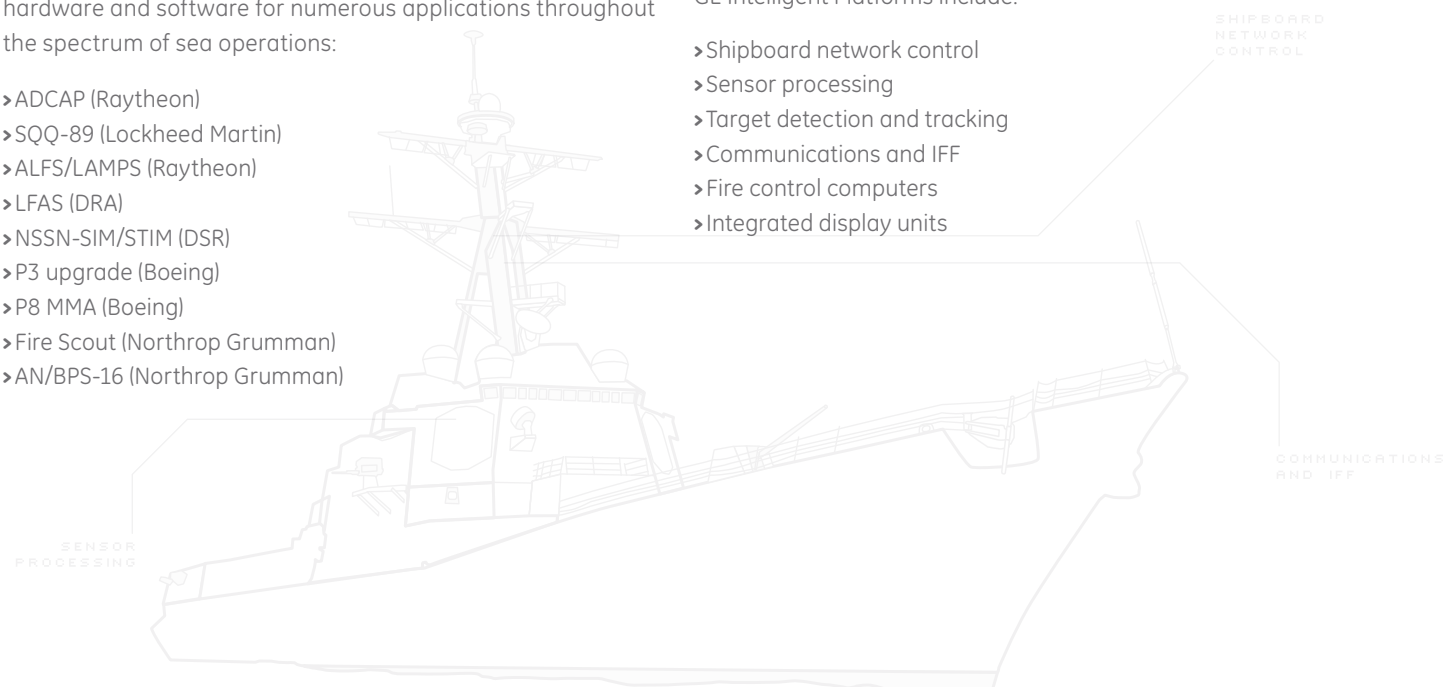


PHOTO COURTESY OF U.S. AIR FORCE

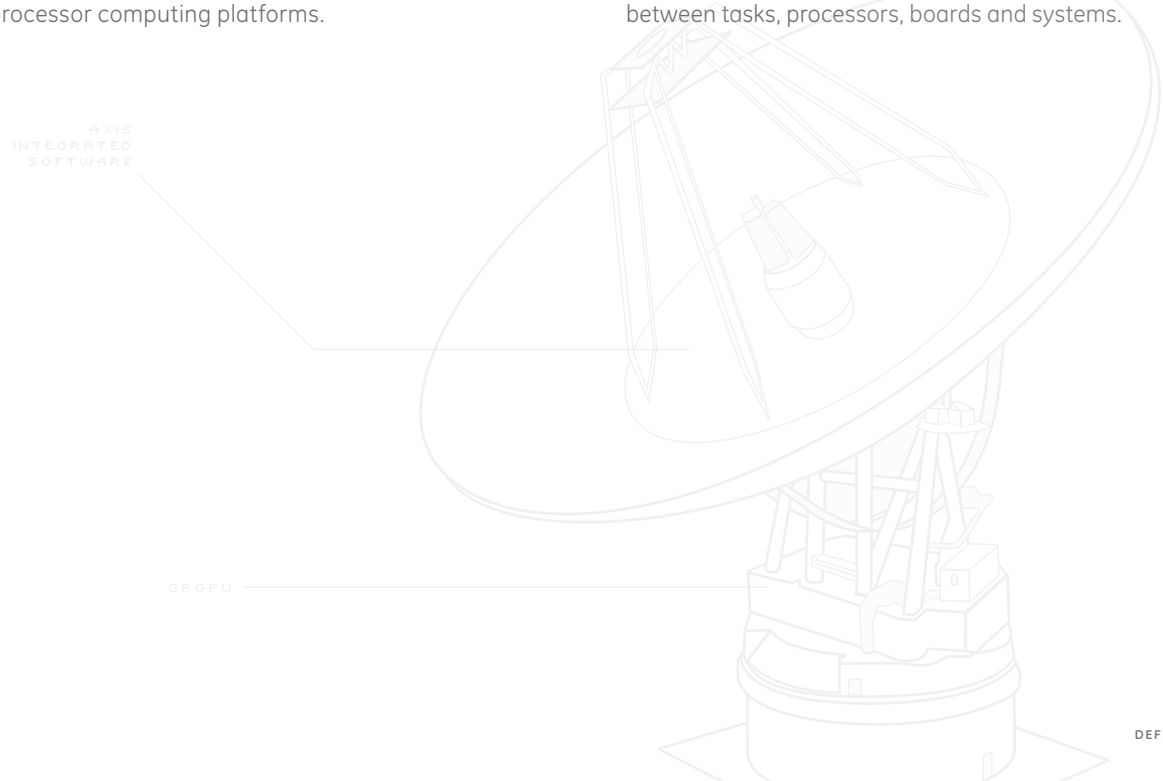
COMMAND AND CONTROL

GE Intelligent Platforms is one of the leading providers of subsystems aimed at giving command and control (C2) centers the real-time intelligence and communications capabilities necessary for successful ground, air and sea operations. We are proven providers of commercial off-the-shelf (COTS) rugged signal processing technologies to military, aerospace and security contractors.

Multifunctional radar installations increasingly demand more processing capability and scalability from their computer systems. Our latest multicore processor computers with miserly heat and power constraints, coupled with serial switched fabrics that optimize board-to-board data transfers, provide the computational firepower these radar systems require. In addition, our latest generation of AXIS integrated software development tools speed the development time needed to build and implement DSP applications for multiprocessor computing platforms.

Communications links between C2 units and field operations is facilitated by an array of GE Intelligent Platforms technologies such as our Software Defined Radio transceivers and our standards-based systems, switches and I/O modules.

Our AXIS graphical software suite lowers the development and maintenance times and costs in radar system development by providing the DSP software development and performance analysis tools necessary to simply the process. The AXIS software is complemented by complete signal- and vector-processing libraries, including recently added Intel and GPGPU libraries. Integrated graphical tools provide developer-friendly system visualizations and the ability to configure, download, run, debug and monitor multiprocessor systems in the GUI environment. AXIS also provides interprocessor communications software with high throughput, low latency, and reconfigurable interconnects that enable data transport between tasks, processors, boards and systems.



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SGT. ALEX C. SAUCEDA

SYSTEMS

Commercial off-the-shelf (COTS) computing systems afford end users access to the most advanced technology at mass-market prices. Platform time-to-market is dramatically reduced along with technical risk. Because the development has already been performed up-front for these standard systems, the non-recurring engineering expense has been greatly reduced, if not eliminated. Emplacing COTS systems in the harsh environments typically encountered in military and aerospace applications will usually require specialized packaging to achieve certification for the lifecycle demanded by the end user.

GE Intelligent Platforms excels at the design of COTS systems with levels of ruggedization ranging from benign to being capable of withstanding harsh military and aerospace conditions such as thermal extremes, vibration, shock, sand and dust, salt fog, humidity, acceleration, electromagnetic interference, and nuclear/electromagnetic pulse, as well as human intrusion and compromise. We provide a full range of COTS system packaging services, from creation of specifications to rigorous qualification testing. GE has developed five levels of circuit board ruggedization, each providing the optimal balance of cost, performance and reliability.

Our engineers first recommend a COTS board based on the performance requirements of the specification, then select the chassis and racks based on the type of cooling (forced air, convection, or conduction) required, as well as estimates of power dissipation, board/slot count, and user environment. After engineering analysis and simulation assures performance capabilities, prototype and qualification testing is conducted to certify that the system will indeed function in the intended environment. All rugged COTS equipment is tested to environmental test specifications that have the widest applicability. MIL-STD-810 has emerged as an important environmental test standard for rugged COTS systems because of its broad applicability to rotary/fixed-wing aircraft as well as ground/amphibious vehicles, but some unique rugged systems specifications require specialized design, analysis and testing to certify the required level of performance in a given environment.

GE has developed a comprehensive process for the development of rugged systems. Our ISO 9000/AS9100 certified design and testing process is exhaustive, but our extensive design data and experience base greatly reduces development time while assuring low program risk for the contractor.

COTS products making up a rugged system can include single board computers, analog and digital I/O boards, Ethernet switches, solid state drives, power supplies, and chassis. Boards, especially I/O boards, can be modified to meet program specifications, and customer-designed or third-party products can also be included in the system specification. Raised lids and media adapters can be included in the chassis design to accommodate the routing of fiber optics and cabling, as can external doghouses for external removable memory.

COTS RUGGED SYSTEMS

GE Intelligent Platforms COTS Rugged Systems are pre-packaged off-the-shelf subsystems designed to eliminate NRE (non-recurring engineering) costs and reduce system development risk through proven, high technology readiness level (TRL) solutions for a range of military vehicle platforms including UAVs, manned aircraft, and manned and unmanned ground vehicles. GE's pre-configured computer systems help to reduce delivery time by offering you numerous pre-configured offerings solutions that can be deployed in the field as soon as your application is ready, or you can use these COTS systems as a starting point for multiple application-specific configurations.

	Form Factor	Slots	Chassis Cooling	Processor	OS Support	I/O	Weight	Operating Temp (degrees C)
CRS-C2P-3CC1	3U cPCI	2	Convection	Power MPC7448 @ 1.0 GHz	VxWorks	Discrete, Ethernet, MIL-STD-1553, Serial, USB, optional SATA drive	11 lbs (5 kg)	-40 to 45
CRS-C3P-3CB1	3U cPCI	3	Cold Plate	Power MPC7448 @ 1.0 GHz	VxWorks	ADC, ARINC 429, DAC, Discrete, Ethernet, MIL-STD-1553, Serial, USB	9 lbs (4 kg)	-40 to 71
CRS-C2I-3CC1	3U cPCI	2	Convection	Intel Core Duo @ 1.666 GHz or Intel Core2 Duo @ 1.5 GHz	Linux, Windows, VxWorks	ARINC 429, CAN Bus, Discrete, Ethernet, MIL-STD-1553, Serial, USB, optional SATA drive	11 lbs (5 kg)	-40 to 45
CRS-C3I-3CB1	3U cPCI	3	Cold Plate	Intel Core Duo @ 1.666 GHz or Intel Core2 Duo @ 1.5 GHz	Linux, Windows, VxWorks	ADC, ARINC 429, DAC, CAN Bus, Discrete, Ethernet, MIL-STD-1553, Serial, USB	9 lbs (4 kg)	-40 to 71

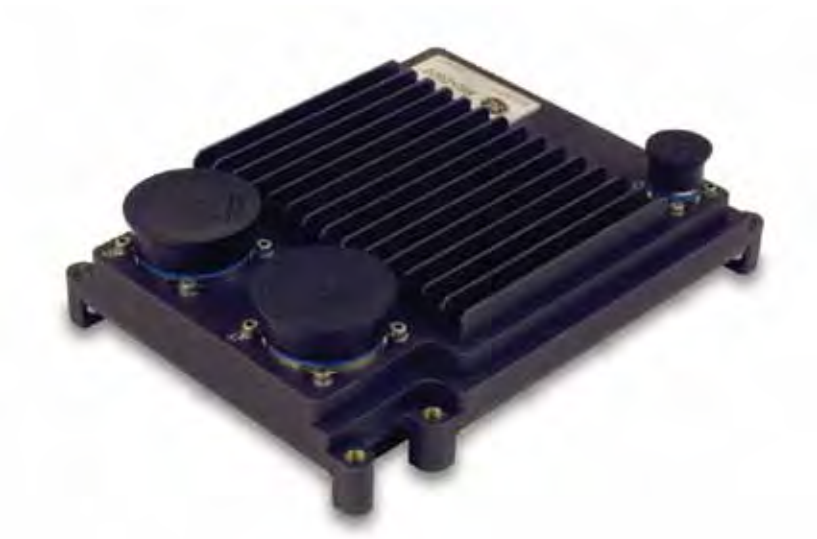
RUGGED ETHERNET SWITCHES

Rugged Ethernet Switches bring the high-speed network connectivity of a managed Layer 2 and Layer 3 gigabit Ethernet switch together with a lightweight, compact, milled-aluminum alloy chassis to provide TCP/IP functionality in harsh environments.

	Dimensions (mm) (H x W x D)	Weight (lbs)	Management Type	Port Type	Cooling	Power Supply
RES-210 RUGGED ETHERNET SWITCH	256.7mm (h) x 185mm (d) x 63.5mm (thick)	4	Fully Managed Layer-2/3+	10/100/1000BaseT	Conduction	28 VDC, Conduction Cooled
GS24	300mm (w) x 100mm (h) x 235mm (d) including connectors	12	Fully Managed Layer-2/3+ or Unmanaged Layer 2	10/100/1000BaseT; option for GigE fiber or 2 10GigE fiber	Base-plate	28VDC
GS12	63.5mm(h) x 165.1mm (w) x 234.5mm (d) including connectors	less than 4	Fully Managed Layer-2/3+ or Unmanaged Layer 2	10/100/1000BaseT	Conduction	28VDC - MilSpec 1275 or MilSpec 704F

REMOTE INTERFACE UNIT

GE Intelligent Platform's RIU-2000 Remote Interface Unit provides a light-weight, low-power interface for Vehicle Management Systems applications. This cost-effective interface has been ruggedized for use in harsh vibration, shock and EMI environments. Configuration flexibility is maximized in this RS 232/422/485 interface, which features conduction cooling and 25W power dissipation. Inputs include two 10/100BaseT Ethernet ports, two RS-232 ports, six RS-422/485 5-wire I/O, 16 analog (-10 to +10V), 16 open/28V discrete, eight TTL discrete, four pulse counter (freq.), one thermocouple analog, three RTD analog (4-wire), and one JTAG. Outputs include eight TTL discrete, four analog (-10V to +10V), 16 open/28V discrete or 16 open/GND discrete, four +10V excitation signals, four -10V excitation signals, four stepper motor drive, and one JTAG.



OFF-THE-SHELF SOLUTIONS

COTS Rugged Systems

Do more without more.

That was the message in a June 2010 directive from the U.S. Under Secretary of Defense to military procurement specialists regarding ways to deliver better value to both the taxpayer and warfighter. A September 2010 Guidance document on means of actually increasing value to stakeholders in an age of shrinking defense budgets took aim at the $400 billion earmarked for contracts for goods and services out of the $700 billion total defense budget.

One key method of effecting cost savings that Under Secretary Ashton B. Carter directed procurement officials to undertake is a shift from Cost Plus contracts to Fixed Cost contracts. In the former, contractors had the ability to pass unanticipated costs along to the Department, while the Fixed Price paradigm holds the contractor to a price determined before the signing of the contract.

The new COTS Rugged System (CRS) line from GE Intelligent Platforms can help contractors achieve platform goals while minimizing the risks inherent with the Fixed Price mode of operation. These SWaP-optimized packaged and pre-validated control computer systems provide rugged computing platforms with a wide range of I/O flexibility for a wide variety of military and aerospace applications. Any CRS computer is deployable as soon as the field application is ready or used as starting point for multiple application-specific configurations. Furthermore, the CRS concept greatly reduces non-recurring engineering fees and system development risks, while providing an initial Technology Readiness Level (TRL) of 6.

A major source of contractor risk, integration of off-the-shelf boards, is already completed, thus shortening the contractor's time to project completion. These modular systems are fully tested and qualified for rugged systems deployment by a company renowned for rugged systems deployments in platforms such as UAVs, missiles, ground vehicles and manned aircraft.

Through computing solutions such as the GE Intelligent Platforms CRS product line, contractors themselves can achieve more without more risk or development cost.

SINGLE BOARD COMPUTERS

GE Intelligent Platforms specializes in the design and manufacture of single board computers (SBCs) tailored to meet the computing and ruggedization needs of the customer. With a wide range of form factors, processor speeds, memory configurations, I/O options and five levels of ruggedization, our line of COTS-based SBCs provide tremendous computing flexibility with considerably lowered program risk.

We recently announced a new line of SBC products based on the 2nd generation Intel® Core i7™ processors. These new dual- or quad-core processors effectively double the computing capabilities of the previous generation of Core i7 processors, along with the addition of Advanced Vector Extensions (AVX) technology. AVX doubles the processor's vector engine from 128 to 256 bits for a tremendous improvement in floating point processing. Radar, sonar, intelligence, surveillance and reconnaissance, and signal processing will be some of the military and aerospace applications to benefit most from the addition of AVX to these Intel flagship processors. Current GE products include the VPXcel3 SBC324 and VPXcel6 SBC624 in 3U and 6U VPX form factors, respectively, the XCR14 rugged 6U CPCI SBC, and the XVR14 rugged 6U VME SBC. All of these SBCs bear dual- or quad-core 2nd generation Core i7 processors running at up to 2.5 GHz.

In parallel, we also announced a new line of SBC products based on Freescale™ Semiconductor's QorIQ 45nm communications and computing platforms designed for high performance in a low-power envelope. Our PPC9B and IMP3A SBCs use the dual-core P2020 processor running at 1.2 GHz and are specifically targeted at SWaP-constrained applications. Our PPC10A, SBC312 and SBC612 products are based on the QorIQ P4080 processor which has eight Power Architecture™ e500mc cores running at 1.5 GHz and are targeted at high-performance applications where benefits can be achieved by software parallelism across the available cores. The eight-core QorIQ offer the ability to compress many existing multi-board applications into one or two multi-core SBCs to achieve considerable SWaP advantages.

PHOTO COURTESY OF U.S. NAVY »
PHAN STEVEN G. CRAWFORD, USN

VME INTEL

	Bus	Size	Slots	Processor					Memory / node				Flash / node	Rear IO Features			
				CPU	Speed MHz	Cores	Chipset	Nodes	Type	Size GB	Speed MHz	ECC	NAND (GB)	Compact Flash	XMC	PMC	1000BaseT
XVR14	VME	6U	1	Corei7 2nd Gen	2500	4	QM67	1	DDR3	16	667	■	16		2	2	2
VR12	VME	6U	1	Corei7	2530	2	QM57	1	DDR3	8	533	■	16		2	2	2
VP12	VME	6U	2	Corei7	2530	2	QM57	1	DDR3	8	533	■	16		1	1	2
VR11	VME	6U	1	Core 2 Duo	2167	2	E7520	1	DDR2	4	400	■		1	1	2	2
VP11	VME	6U	2	Core 2 Duo	2167	2	E7520	1	DDR2	4	400	■		1	1	2	2
XVB601	VME	6U	1	Corei7	2530	2	QM57	1	DDR3	8	533	■		1	1	2	2
V7768	VME	6U	1	Core 2 Duo	2167	2	945GM	1	DDR2	2	333			1		1	
V7769	VME	6U	2	Core 2 Duo	2167	2	945GM	1	DDR2	2	333			1		3	
V7875	VME / VXS	6U	1	Core 2 Duo	2530	2	GM45	1	DDR3	8	533			1	1	1	2
V7865	VME / VXS	6U	1	Core 2 Duo	2160	2	945GM	1	DDR2	3	333			1		1	2
V7812	VME / VXS	6U	2	Xeon	2130	4	5100	1	DDR2	4	333	■				2	2

NOTE: Not all IO features are available on the same board due to pin-out constraints. Please check the product manual for details of IO pin sharing.

VME POWERPC

	Bus	Size	Slots	Processor					Memory / node				Flash / node		Rear IO Features		
				CPU	Speed MHz	Cores	Chipset	Nodes	Type	Size (GB)	Speed MHz	ECC	NOR (MB)	NAND (GB)	XMC	PMC	AFIX
PPC10A	VME	6U	1	P4080	1500	8	Integrated	1	DDR3	8	650	■	512	4	2	2	1
PPC9B	VME	6U	1	P2020	1200	2	Integrated	1	DDR3	4	400	■	768		1	2	1
PPC9A	VME	6U	1	864xD	1333	2	Integrated	1	DDR2	4	266	■	1012		2	2	1
PPC8A	VME	6U	1	7448	1000	1	Discovery	1	SDRAM	1	100	■	512			2	
PPC7D	VME	6U	1	7448	1400	1	Discovery 3	1	DDR	1	133	■	512			2	1
PPC7A5X	VME	6U	1	7457	1100	1	Discovery	1	SDRAM	1	133	■	128			2	
PPC7A10	VME	6U	1	7410	500	1	Discovery	1	SDRAM	1	133	■	128			2	
PPC4A	VME	6U	1	7410	500	1	MPC107	1	SDRAM	0.5	100	■	64			2	
PPCM2	VME	6U	1	7448	1400	1	Discovery 3	2	DDR	1	133	■	512			2	
VG6	VME	6U	1	8461D	1333	2	Integrated	2	DDR2	2	200	■	256		1	2	
VG5	VME	6U	1	7457	1267	1	Discovery 2	2	DDR	0.5	133	■	256			2	
EP2A	VME	6U	1	7448	1400	1	Discovery 5	1	DDR2	1	200	■	512			2	1

NOTE: Not all IO features are available on the same board due to pin-out constraints. Please check the product manual for details of IO pin sharing.

Advanced VME single board computers use the latest Intel technology, including the 2nd generation Core i7 and Core i5 dual and quad core processors with AVX and Turbo technologies and Gen 2 PCIe SATA capability. VME technology is still dominant in many embedded board markets and has proven itself to be a stable technology that evolves with the needs of the rugged computing markets.

Rear IO Features									Front IO Features								
COM	USB	SATA	GPIO	VGA	DVI	Audio	VME 64x	VME 2eSST	Gig E	Fast E	COM	Key'd / Mse	USB	SAS	VGA	DVI	Rugged Options
2	2	4	12	2	2	1		■	2		1		1		1		Air and conduction cooled
2	2	2	12	2	2			■	2		1		1		1		Air and conduction cooled
2	2	2	12	2	2			■	2		1		1		1		Air cooled
2	2	2	8	1	1	1		■	2	1	1		2		1		Air and conduction cooled
2	2	2	8	1	1	1		■	2	1	1		2		1		Air cooled
1	4	4	8	1	1			■	2		1		4		1	1	Air cooled
1	4	2	8				■		2		1	1	2		1		Air cooled
1	4	2	8				■		2		1	1	2	2	1		Air cooled
1	2	2						■	4		1		4		1	1	Air cooled
1	2	2		1	1			■	2		1	1	2		1		Air cooled
1	2	2			1			■	2		1		4	2	1		Air cooled

GE Intelligent Platforms complements its VME processor solutions with QorIQ / PowerPC-based 6U single board computers developed to meet the needs of demanding embedded applications.

Rear IO Features												Front IO Features					
1000BaseT	FastE	COM	USB	Key'd / Mse	Parallel Port	SCSI	SATA	GPIO	StarFabric	VME 64x	VME 2eSST	Gig E	Fast E	COM	Key'd / Mse	USB	Rugged Options
4		8	2				2	31			■	2		2		2	Air and conduction cooled
2		6	4	1	1		2	26			■	1		1		1	Air and conduction cooled
2		6	2				2	19			■						Air and conduction cooled
1	2	6	4	1	1	1		16		■		1		2	1	3	Air cooled
2		6	2	1	1			17		■							Air and conduction cooled
	2	6	2	1	1	1		16		■							Air and conduction cooled
	2	6	2	1	1	1		16		■							Air and conduction cooled
	1	4		1	1	1					■						Air and conduction cooled
2		4	2					22	2		■						Air and conduction cooled
2	2	4	4				2	32			■	1		1		2	Air and conduction cooled
2	2	6					1	32		■		1	1	2			Air and conduction cooled
2		6	2	1				8			■						Air and conduction cooled

CPCI INTEL

				Processor					Memory / node				Flash / node	Rear IO Features			
	Bus	Size	Slots	CPU	Speed MHz	Cores	Chipset	Nodes	Type	Size GB	Speed MHz	ECC	NAND GB	Compact Flash	XMC	PMC	1000BaseT
XCR14	CPCI	6U	1	Corei7 2nd Gen	2500	4	QM67	1	DDR3	16	667	■	16		2	2	2
CR12	CPCI	6U	1	Corei7	2530	2	QM57	1	DDR3	8	533	■	16		2	2	2
CT12	CPCI	6U	1	Corei7	2530	2	QM57	1	DDR3	8	533	■	16		2	2	4
CR11	CPCI	6U	1	Core 2 Duo	2167	2	E7520	1	DDR2	4	400	■		1	1	2	2
CT11	CPCI	6U	1	Core 2 Duo	2167	2	E7520	1	DDR2	4	400	■		1	1	2	2
CP11	CPCI	6U	2	Core 2 Duo	2167	2	E7520	1	DDR2	4	400	■		1	1	2	2
C7806RC	CPCI	6U	1	Pentium	1800	1	855GME	1	DDR	1	400			1		2	2
ACR301	CPCI	3U	1	ATOM/E6xxx	1600	1	Topcliff	1	DDR2	1	400		8			1	2
CL11	CPCI	3U	1	Core 2 Duo	2.16 GHz	2	945GM	1	DDR2	2	667			1			2
CC11	CPCI	3U	2	Core 2 Duo	2.16 GHz	2	945GM	1	DDR2	2	667			1			2
CR5	CPCI	3U	1	Core 2 Duo	1500	2	3100	1	DDR2	2	400	■		1			2

NOTE: Not all IO features are available on the same board due to pin-out constraints. Please check the product manual for details of IO pin sharing.

CPCI POWERPC

				Processor					Memory / node				Flash / node		Rear IO Features		
	Bus	Size	Slots	CPU	Speed MHz	Cores	Chipset	Nodes	Type	Size GB	Speed MHz	ECC	NOR MB	NAND GB	Compact Flash	PMC	AFIX
IMP3A	CPCI	3U	1	P2020	1200	2	Integrated	1	DDR3	4	400	■	256	8		1	
IMP2B	CPCI	3U	1	7448	1400	1	Discovery 5	1	DDR2	1	200	■	256			1	
IMP2A	CPCI	3U	1	7448	1400	1	Discovery 3	1	DDR	0.5	133	■	128			1	
IMP1A	CPCI	3U	1	7410	500	1	Discovery	1	SDRAM	0.128	100	■	64			1	
CM6	CPCI	3U	1	8641D	1333	2	Integrated	1	DDR2	1	333	■	256			1	
CM4R	CPCI	3U	1	7410	500	1	MPC107	1	SDRAM	0.256	100	■	64			1	
CP1A	CPCI	6U	1	7448	1400	1	Discovery 3	1	DDR	1	133	■	512			2	1
C2KA	CPCI	6U	1	7448	1400	1	Discovery 3	1	DDR	2	167	■	512			2	
C7055RC	CPCI	6U	1	750GX	1000	1	Discovery 3	1	DDR	1	200	■	128		1	2	

NOTE: Not all IO features are available on the same board due to pin-out constraints. Please check the product manual for details of IO pin sharing.

A comprehensive line of rugged and industrial 3U and 6U Intel-based CompactPCI single board computers for high performance embedded computing applications. These CPCI SBCs feature up to 2nd Generation Core i7 and Core i5 processors with Gen 2 PCIe SATA, and Intel AVX and turbo technologies. Products range from boards targeted to the unique needs of telecommunications and military applications to general purpose boards that can be applied to a wide variety of embedded applications.

Rear IO Features												Front IO Features							
COM	USB	Key'd / Mse	SATA	IDE	GPIO	VGA	DVI	Audio	IPMI	CPCI 32	CPCI 64	Gig E	Fast E	COM	USB	Audio	VGA	DVI	Rugged Options
2	4		4		13	2	2	1	1		■	2		1	1		1		Air and conduction cooled
2	4		3		13	2	2		1		■	2		1	1		1		Air and conduction cooled
2	4		3		13	2	2		1		■	2		1	1		1		Air cooled
2	2		2		8	1	1	1	1		■	2	1	1	2		1		Air and conduction cooled
2	2		2		8	1	1	1	1		■	2	1	1	2		1		Air cooled
2	2		2		8	1	1	1	1		■	2	1	1	2		1		Air cooled
1	3	1	2	1		1	1				■	2		1					Air cooled
2	2		1		8	1				■									Air and conduction cooled
1	6		2		8					■		2			2	1	1		Air cooled
1	2		2		8					■		Up to 4		1	3	1	1	1	Air cooled
2	2		2		8	1				■									Air and conduction cooled

PowerPC-based CompactPCI Single Board Computers are designed for use in a broad spectrum of applications from military and aerospace to commercial and telecommunications systems. They are available with diverse feature sets and varying ruggedization levels to accommodate the unique requirements of demanding, high performance computing applications.

Rear IO Features											Front IO Features				
1000BaseT	FastE	COM	USB	Key'd / Mse	Parallel Port	SATA	IDE	GPIO	CPCI 32	CPCI 64	Gig E	COM	Key'd / Mse	USB	Rugged Options
2		2	1			2		16	■						Air and conduction cooled
1		2	2					4	■						Air and conduction cooled
2		2						12	■						Air and conduction cooled
	2	2						12	■						Air and conduction cooled
2		2						8	■						Air and conduction cooled
	1	4						8	■						Air and conduction cooled
2		6	2	1	1			33		■		2	2	3	Air and conduction cooled
3		8	3			2		16		■				1	Air and conduction cooled
2		2					1			■	1	1			Air cooled

COMPUTER ON MODULES

Computer on Modules (COM) address the need for standardized small form factor computing platforms. COMs are the perfect solution for long-term applications where technology and performance upgrades are a must. COMs are without connectors for USB, LAN, VGA, etc. and must be attached to an I/O board to fullfil an application's I/O requirements. Upgrades are easily managed through an exchange of the existing Computer Module to one based on the latest technology, in effect extending the lifecycle of the application.

	Form Factor	Processor Type & Speed	Maximum Memory	VGA	LAN	PCI Express	PCI	SATA	Other
bCOM2-L1100	COM Express Basic, Type 2	Intel Core 2 Duo @ 2.26 GHz	4 GB DDR3 SDRAM	1	1	x16=1, x4=1	1	4 RAID	Shock/vibe protection, 8x USB, 8x GPIO, HDA; optional extended operating temperature range

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PROCESSOR PMC

Processor PMCs (PrPMC) maximize design flexibility with a modular approach to adding processing power to a host board. The PMC Card functions as a complete processor subsystem and can be used to control a carrier card, effectively making it into a Single Board Computer or blade. The processor module can be added to any system with an open PMC slot.

	Processor Type & Speed	Maximum Memory	Bus Interface Chip	Ethernet	Serial I/O
EmPower PrPMCQ2	Freescale 8280 PowerQUICC II @ 450 MHz	32 MB SDRAM	Powerspan II	10/100BaseT	4

PROCESSOR AMC

The AdvancedTCA® modular design concept serves as the basis for our Processor AdvancedMC products. Both the Telum ASLP11 and Telum ASLE11 bring a full set of processor capabilities to a carrier board, and can be incorporated into any host card or MicroTCA™ system with the appropriate mechanical and electrical connections. Both processors employ the Intel® Core 2 Duo processor running a 1.5 GHz and 4 GB DDR2 SDRAM with ECC and Intel 3100 chipset. The Processor AdvancedMCs also include two Gigabit Ethernets, eight PCI Express a two SATA interconnects.

OpenVPX

Military strategy increasingly demands more efficient use of computer networks to obtain the highest level of situational awareness in the field. Achieving this growing requirement will require greater use of distributed, network-centric multi-processor computing technologies to gather and analyze data, then distribute information garnered from disparate sensor systems in the field. The American National Standards Institute (ANSI) in 2007 ratified the VITA 46 standard, also known at VPX, to facilitate interoperability at the board level, but the need for similar interoperability at the system level quickly became apparent. GE Intelligent Platforms participated in the development of a VPX-based system specification that in 2010 was ratified as VITA 65, or OpenVPX.

This new standard allows VPX interoperability to be brought up to multi-vendor, multi-module integrated systems. The end result is module-to-module, module-to-backplane, and development chassis integration. OpenVPX specifies a set of system architectures using existing VPX Ruggedized Enhanced Design Implementation (REDI) standards and drafts with a minimum of changes. It provides definitions for multiple planes for utility, management, control, data and expansion, as well as a variety of sizes for serial communication pipes.

OpenVPX also defines several types of profiles for structure and hierarchy, including slot profile, backplane profile, module profile, and development chassis profile. The backplane profiles are further defined for centralized switching, distributed switching, and hybrid backplane topologies. System-level specifications defining interoperability points within the architecture include backplane topologies and development chassis, module-level pin out and protocol definitions, chassis and backplane definitions for power and system signals, and interoperability compliance recommendations.

Our GRA111 graphics board uses the NVIDIA GT 240 chipset in a 3U form factor for radar systems and other mil/aero applications. The GRA111 provides RS170, NTSC and PAL, DVI, and VGA I/O for configuration flexibility, and can be air- or conduction-cooled.

ATCA

With limited real estate for mezzanines on next-generation ATCA processor blades, adding I/O with AdvancedMCs may not be an option. Intelligent Advanced Rear Transition Modules (ARTMs) offer a powerful, flexible solution. Using the Zone 3 connector through the rear of the ATCA blade, system designers can tailor the I/O capabilities of their processor blades to their application. Intelligent ARTMs do more than simply extend a port; they add functionality to the processor blade. GE can customize the functionality and the pinouts for specific applications.

VPX INTEL

				Processor					Memory / node				Flash / node	Rear IO Features					
	Bus	Size	Slots	CPU	Speed MHz	Cores	Chipset	Nodes	Type	Size GB	Speed MHz	ECC	NAND GB	XMC	PMC	1000BaseT	1000BaseBX	COM	USB
SBC624	VPX	6U	1	Corei7 2nd Gen	2500	4	QM67	1	DDR3	16	667	■	16	2	2	2	2	2	6
SBC622	VPX	6U	1	Corei7	2530	2	QM57	1	DDR3	8	533	■	8	2	2	2	2	2	6
SBC324	VPX	3U	1	Corei7 2nd Gen	2500	4	QM67	1	DDR3	16	667	■	16	1		2		2	4
SBC341	VPX	3U	1	Core 2 Duo	2260	2	GM45	1	DDR3	8	533		1			1		2	4
SBC340	VPX	3U	1	Core 2 Duo	2160	2	945GM	1	DDR2	4	333		1			1		2	4
SBC320	VPX	3U	1	Core 2 Duo	1500	2	3100	1	DDR2	2	333	■	1		1	2		2	2

NOTE: Not all IO features are available on the same board due to pin-out constraints. Please check the product manual for details of IO pin sharing.

VPX POWERPC

				Processor					Memory / node				Flash / node		Rear IO Features					
	Bus	Size	Slots	CPU	Speed MHz	Cores	Chipset	Nodes	Type	Size GB	Speed MHz	ECC	NOR MB	NAND GB	XMC	PMC	1000BaseT	1000BaseBX	COM	USB
SBC612	VPX	6U	1	P4080	1500	8	Integrated	1	DDR3	8	650	■	512	4	2	2	4	2	8	2
SBC610	VPX	6U	1	8641D	1333	2	Integrated	1	DDR2	4	266	■	1024		2	2	2		6	2
SBC312	VPX	3U	1	P4080	1500	8	Integrated	1	DDR3	4	650	■	512	8	1	1	2		4	2
SBC330	VPX	3U	1	8641D	1500	2	Integrated	1	DDR2	4	266	■	512				2		2	3
SBC310	VPX	3U	1	864xD	1333	2	Integrated	1	DDR2	2	266	■	512		1	1	2		2	2

NOTE: Not all IO features are available on the same board due to pin-out constraints. Please check the product manual for details of IO pin sharing.

VPX (previously known as VITA 46) brings switched fabrics to VME-based systems. VPX was specifically created with the defense community in mind. It retains the 6U and 3U form factors, supports existing PMC and XMC mezzanines, and maintains the maximum possible compatibility with VME for high performance computing. These boards sport up to 2nd generation Core i7 and Core i5 dual and quad processors, Gen 2 PCIe SATA, AVX and turbo technologies,

Rear IO Features								Front IO Features				Fabric								
Key'd / Mse	SATA	GPIO	VGA	DVI	Audio	IPMI	BMM	Gig E	COM	USB	DVI	Infiniband	10gigE	PCIe Gen 1 x4	PCIe Gen 1 x16	PCIe Gen 1 x1	PCIe Gen 2 x4	PCIe Gen 2 x16	PCIe Gen 2 x1	Rugged Options
	3	8	1	1	1	1			1	1	1	2	2				4			Air and conduction cooled
	3	8	1	1	1		1	1	1	2			2	4						Air and conduction cooled
	2	6	1		1		1										1	1	1	Air and conduction cooled
1	2	2	1		1									1	1	1				Air and conduction cooled
1	2	2	1		1									1	1	1				Air and conduction cooled
	1	4					1							2						Air and conduction cooled

VPX (previously known as VITA 46) brings switched fabrics to VMEbus-based systems. VPX was specifically created with the defense community in mind, and it retains the existing 6U and 3U form factors, supports existing PMC and XMC mezzanines, and maintains the maximum possible compatibility with VMEbus.

Rear IO Features						Front IO Features				Fabric				
Key'd / Mse	SATA	GPIO	IPMI	BMM	VME 2eSST	Gig E	COM	USB	DVI	SRIO	PCIe Gen 1 x16	PCIe Gen 1 x1	PCIe Gen 2 x4	Rugged Options
	2	19	1			2	2	2		4	4			Air and conduction cooled
	2	19		1	■					4	2			Air and conduction cooled
	2	8	1										2	Air and conduction cooled
1	2	8									1	1		Air and conduction cooled
	2	6		1							2			Air and conduction cooled

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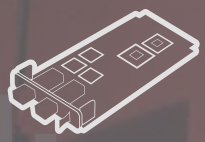
MULTIPROCESSING

GE Intelligent Platforms' line of COTS multiprocessor hardware solutions includes single board computers (SBCs) and multiprocessors based on Intel, NVIDIA and PowerPC processors, as well as fabric switch cords, PMC/XMC carriers and FPGA processing engines. We also offer our market-leading AXIS suite of multiprocessor software that includes an integrated development environment and high-performance math and function libraries that reduce development time and maximize performance for even the most demanding signal and data processing applications. Our multiprocessor hardware and software products have been incorporated into numerous deployed platforms that include underwater and naval surface sonar, land-based radar, and airborne sensor, image and radar processing.



The DSP280 is a rugged dual socket multiprocessor based on the 2nd Generation Intel Quad Core i7 that was designed to meet the rigorous real-time demands of applications such as intelligence, surveillance, and reconnaissance (ISR), radar, sonar, image and sensor processing across a wide range of platforms including manned and unmanned airborne, ground and naval vehicles.

The IPN250 is the world's first 6U OpenVPX GPGPU COTS board for rugged military and aerospace applications. Customers can deploy their CUDA, OpenCL, OpenGL and video and image processing applications developed on Intel- and NVIDIA®-enabled PCs directly onto GE's new rugged GPGPU platforms. The IPN250 delivers unprecedented levels of computing performance for SWaP-constrained platforms at lower cost, thus creating new application opportunities that were previously unthinkable. The IPN250 enables system integrators to deploy a single COTS module where previously multiple disparate modules would have been required - for example, undertaking front-end processing of sensor-acquired data, digital signal processing, backend processing and graphics/video processing, and delivering high-resolution mission-critical data more rapidly than has previously been possible.

Our lineup also includes the NPN240, which is the world's first rugged, NVIDIA CUDA-enabled dual GPGPU multiprocessor for military and aerospace applications. The NPN240 features two NVIDIA CUDA-capable GT240 96-core GPUs that enable it to deliver up to 750 GFLOPS peak per card slot. Multiple NPN240s can be linked to single or multiple hosts to create multi-node CUDA GPU clusters capable of thousands of GFLOPs. Providing a highly computationally-dense platform, the NPN240 is ideal for demanding SWaP-constrained applications. Many military/aerospace companies and organizations are finding CUDA technology exciting, as it has been demonstrated to be capable of delivering significant improvements. Indeed, one company experienced a 15x increase in throughput in a radar application.

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VAL GEMPIS, USAF

ADVANCED MULTI-PROCESSOR INTEGRATED SOFTWARE

AXIS

Most application engineers want to focus on application functionality rather than underlying hardware complexities.

Our AXIS Advanced Multiprocessor Integrated Software development tools take away a large portion of that software development burden so that engineers can instead get their new systems completed that much more quickly. The AXIS family consists of three integrated toolsets: AXIS™Flow, AXIS™View and AXIS™Lib.

The AXISFlow interprocessor communications software module facilitates data transport between tasks, processors, boards and systems using high-throughput, low-latency, reconfigurable communications channels. Integration of processing elements is seamlessly scalable regardless of project size. In addition, AXISFlow is independent of the type of processor, RTOS, or fabric, so future technology changes will be transparent to the communications software. AXISFlow can be operated in stand-alone mode or as an integrated element within the AXIS Advanced Multiprocessor Integrated Software environment.

AXISView provides a suite of graphical software tools for the development of multiprocessor applications. Through tools such as ConsoleView, HardwareView, ApplicationView, RuntimeView, EventView, HealthView and AXISRun, this productivity suite simplifies the process of implementation and analysis of real-time multicore and multiprocessor applications.

The AXISLib optimized DSP and math libraries provide a valuable set of building blocks for the quick and efficient development of applications. Our existing AXISLib-PPC performance-optimized DSPlibrary for Altivec, and AXISLib-CL DSP library for generic architectures have been joined by two new optimized DSP and vector math libraries. These new libraries, AXISLib-x86 and AXISLIB-GPU, facilitate the development of GE's single board computer (SBC) and multiprocessor applications for Intel- and General Purpose computation on Graphics Processing Units (GPGPU)-based architectures.

The AXISLib-x86 DSP and math libraries facilitate the development of military and aerospace applications in sensor and signal processing, radar, sonar, image processing, and signal intelligence for deployed air-, land- and sea-based deployment. Our AXISLib libraries can be deployed on the full range of GE SBCs and multiprocessors based on Freescale's Power architecture and Intel multicore processors.

The functionality of the AXISLib-x86 module includes comprehensive signal and vector processing with more than 600 functions. The module is fully optimized for the Intel x86 processor and associated SSE SIMD unit. AXISLib-x86 consists of both single and multi-threaded libraries, thus allowing libraries to leverage multi-core and hyper-threaded processors running SMP. The libraries can be run in development mode with error checking or in production mode for maximum performance. The suite provides industry-standard API for greatest portability (VSIPL Core 1.0+) as well as GE's proprietary C API for the greatest level of flexibility across the Windows, VxWorks and Linux operating systems. AXISLib-x86 supports Intel x86 architectures with SSE 3.0 or higher.

Similarly, the new AXISLib-GPU middleware provides a high-performance library of optimized math and DSP functions for efficient development of applications for the emerging multi-processing paradigm of GPGPU technology, and especially GE's growing line of rugged, NVIDIA CUDA-enabled platforms.

AXISLib-GPU provides comprehensive signal and vector processing functionality, providing the VSIPL API with more than 500 functions. The library is optimized for CUDA and fully optimized for NVIDIA CUDA architecture libraries for GE Intelligent Platforms' GPGPU platforms. The multi-threaded module leverages the massively parallel architecture of the GPU cores' Single Precision (SP) floating-point data processing capabilities with core computations implemented as CUDA kernels. AXISLib-GPU provides maximum portability, with VSIPL API offering industry-standard API. The module is VSIPL Core Lite-compliant, and provides many functions from the Core 1.0 profile. AXISLib-GPU is portable across the Windows and Linux operating systems, and provides both 32- and 64-bit support.

Our latest AXIS product, AXISLib-AVX, provides more than 600 high-performance DSP and vector math functions for the new 2nd Generation Intel Core i7 multicore, multithreaded platforms with Advanced Vector Extension (AVX). The VSIPL open standard API affords development code portability across multiple CPU generations and architectures for maximum system and application performance, faster system time-to-market, and easy technology refreshes across the lifecycle of the platform.

AXISLib-AVX is designed to maximize the built-in floating point processing capabilities of the 2nd Generation Core i7 processors in real-time applications such as ISR, UAVs, signal processing and sonar.

AXIS MULTIPROCESSING SOFTWARE

AXIS - Advanced Multiprocessor Integrated Software is a set of software modules that can be used to accelerate the design, development, testing and deployment of complex DSP and multiprocessing platforms for real-time applications such as radar, sonar, communications and image processing.

	Description
AXISLib-AVX	AXISLib-AVX is a set of DSP and vector math libraries providing over 600 high performance functions created to help developers maximize system and application perfomance. Provides both VSIPL and priopertary GE APIs to support the very latest 2nd generation Intel Core i7 processors based on the 'Sandy Bridge' x86 architecture with AVX (Advanced Vector Extensions).
AXISLib-GPU	AXISLib-GPU is a DSP and vector math library that supports rapid development of the growing number of DSP and multiprocessing applications taking advantage of the power of GPGPU technology. Provides the VSIPL API to support GE's latest GPU hardware.
AXISLib-x86	AXISLib-x86 is a set of DSP and vector math libraries providing over 600 high performance functions created to help developers maximize system and application perfomance. Provides both VSIPL and priopertary GE APIs to support Intel processors with SSE (Streaming SIMD Extensions).

	Description
AXISLib-PPC	AXISLib-PPC is a set of DSP and vector math libraries providing over 600 high performance functions created to help developers maximize system and application perfomance. Provides both VSIPL and priopertary GE APIs for Power Architecture/PowerPC with Altivec support.
AXISLib-CL	AXISLib-CL is a set of DSP and vector math libraries written in 'C' to help developers reduce devlopment time Provides both VSIPL and priopertary GE APIs for generic Intel and PPC architectures.
AXISFlow	Provides a high performance interprocessor communication middleware supporting any node to any node data movement over multiple fabrics for both homogeneous and hetergeneous processor architectures.
AXISView	A suite of integrated graphical tools for multiprocessor systems, provides system visualization and the ability to configure, download, run, debug and monitor multiprocessor applications.
AXISPro	Combined package of AXISView & AXISFlow for multiprocessor software development.

AXIS-ENABLED MULTIPROCESSOR HARDWARE

GE Intelligent Platforms AXIS Advanced Multiprocessor Integrated Software facilitates development and integration of a wide range of Intel, NVIDIA and Power Architecture Single Board Computers (SBC), Multiprocessors and Switch Fabric Modules reducing time-to-solution and cost of ownership for a variety of 3U and 6U form factors including OpenVPX, VME, VXS, and cPCI. These Commercial-off-the-shelf (COTS) modules offer optimized size, weight and power (SWaP) solutions to support expanded mission profiles for a variety of intelligence, reconnaissance and surveillance (ISR) applications. System integrators can now harness the performance and flexibility of mainstream, high performance computing (HPC) architectures and software ecosystems with our latest Intel multicore boards, NVIDIA many-core GPGPU cards and high speed switch fabric modules for deployed rugged airborne, ground vehicle and naval platforms.

	Form Factor	Processors	Memory	Fabric Interface	Mezzanine	Ethernet	Operating System (OS) Support	Ruggedization	AXIS Enabled
DSP280	VPX 6U	Dual Socket Intel 2nd Generation Quad Core i7	16GB	RDMA enabled 10GE & Infiniband with Gen 2 PCIe & GbE	None	10GE/IB via rNICs 1000BaseT 1000BaseBX	Linux, Windows, VxWorks	Levels 1, 2 & 3 air cooled, Levels 4 & 5 conduction cooled	■
IPN250	VPX 6U	Intel Core 2 Duo Penryn & NVIDIA GT240 96 core GPU	4GB	10GE, PCIe, GbE	None	10GE 1000BaseT 1000BaseBX	Windows, Linux-SDK	Levels 1 & 2 air cooled, Level 4 conduction cooled	■
NPN240	VPX 6U	Dual NVIDIA GT240	2GB	PCIe	None	None	Windows, Linux-SDK	Levels 1 & 2 air cooled, Level 4 conduction cooled	■
DSP230	VPX 6U	Quad MPC8640D	4GB	SRIO, PCIe, GbE	PMC/XMC	1000BaseT	Linux-SDK, VxWorks	Levels 1 & 2 air cooled, Level 4 conduction cooled	■
DSP220	VXS 6U	Quad MPC8641 or Quad MPC8640D	2GB or 4GB	SRIO, GbE, VME 2eSST	XMC	1000BaseT	LynxOS, VxWorks	Levels 1 & 2 air cooled, Level 6 spray cooled	■
G4ADSP	VME 6U	Quad MPC7448	1GB	PCI, GbE, VME64	2 x PMC-X	1000BaseT	VxWorks	Levels 1, 2 & 3 air cooled, Levels 4 & 5 conduction cooled	■
G4DSP-XD3	VME 6U	Quad MPC7448	1GB or 2GB	Starfabric, GbE, VME64	2 x PMC-X	1000BaseT	VxWorks	Levels 1, 2 & 3 air cooled, Levels 4 & 5 conduction cooled	■
6U OpenVPX CUDA Starter Kit	VPX 6U	IPN250 & NPN240		10GE, PCIe, GbE	None	10GE 1000BaseT 1000BaseBX	CentOS 64-bit Linux & CUDA SDK	Level 1	■

AXIS-ENABLED SINGLE BOARD COMPUTERS

AXIS Advanced Multiprocessor Integrated Software support extends beyond our multiprocessor card set to include selected members from our high performance Single Board Computer (SBC) product families. These modules provide a complete solution by supporting a wide range of system and data I/O options along with integrated support for AXISFlow interprocessor communication middleware, AXISView GUI and the AXISLib math and function libraries. These SBC's are designed to compliment the multiprocessing product range, however they may also form the heart of the signal or data processing system by connecting multiple cards to achieve computing densities of between two to twenty or more CPUs per enclosure.

	Form Factor	Processor Type & Speed	AXISView and AXISFlow support	AXISLib support
V7865	VME 6U	Intel Core Duo @ 2.0 GHz	Full support in AXIS 4.2 (Linux only); Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
PowerXtreme PPC7D	VME 6U	Freescale 7448 @ 1.4 GHz	Full support in AXIS 4.2; Generic platform support in 5.0; Ethernet & Starfabric; VxWorks	AXISLIB-PPC: VxWorks, Linux, LynxOS
PowerXtreme PPC9B	VME 6U	Freescale QorIQ P2020 @ 1.2 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-CL: VxWorks, Linux, Windows
V7875	VXS 6U	Intel Core 2 Duo @ 2.53 GHz	Full support in AXIS 4.2; Generic platform support in 5.0; Ethernet only; Linux	AXISLIB-x86: VxWorks, Linux
VPXcel6 SBC622	VPX 6U	Intel Core i7 up to 2.53 GHz	Full support in AXIS 5.0 (Linux only); Ethernet only; Generic platform support for VxWorks.	AXISLIB-x86: VxWorks, Linux
XtraPower PPCM2	VME 6U	2x Freescale 7448 @ 1.4 GHz	Full support in AXIS 4.2 and 5.0; Ethernet and Starfabric; VxWorks	AXISLIB-PPC: VxWorks, Linux, LynxOS
V7812	VXS 6U	Intel Quad-Core Xeon @ 2.13 GHz	Full support in AXIS 4.2 (Linux only); Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
VPXcel6 SBC620	VPX 6U	Intel Core 2 Duo @ 1.8 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
VPXtreme6 SBC610	VPX 6U	Freescale 8641D @ 1.5 GHz	Full support in AXIS 4.2 and 5.0; Ethernet, AMP, & SRIO; VxWorks, Linux	AXISLIB-PPC: VxWorks, Linux, LynxOS
PowerXtreme PPC9A	VME 6U	Freescale 8641D @ 1.33 GHz	Full support in AXIS 4.2 and 5.0; Ethernet and AMP; VxWorks	AXISLIB-PPC: VxWorks, Linux, LynxOS
VPXtreme6 SBC612	VPX 6U	Freescale QorIQ P4080 @ 1.5 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-CL: VxWorks, Linux, Windows
VPXcel3 SBC320	VPX 3U	Intel Core 2 Duo @ 1.5 GHz	Full support in AXIS 5.0 (VxWorks only); Ethernet and PCIe; Genric platform support for Linux	AXISLIB-x86: VxWorks, Linux
VPXcel3 SBC340	VPX 3U	Intel Core 2 Duo @ 1.5 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
VPXcel3 SBC341	VPX 3U	Intel Core 2 Duo @ 2.26 GHz	Full support in AXIS 5.0 (Linux only); Ethernet only; Generic platform support for VxWorks.	AXISLIB-x86: VxWorks, Linux
VPXcel6 SBC324	VPX 3U	Intel 2nd Gen. Core i7 dual/quad-core up to 2.5 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-AVX: VxWorks, Linux
VPXcel6 SBC624	VPX 6U	Intel 2nd Gen. Core i7 dual/quad-core up to 2.5 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-AVX: VxWorks, Linux
VR12	VME 6U	Intel Core i7 up to 2.53 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
VR11	VME 6U	Intel Core Duo @ 2.0 GHz	Full support in AXIS 4.2 (Linux only); Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
XVB601	VME 6U	Intel Core i7 up to 2.53 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
V7768	VME 6U	Intel Core 2 Duo @ 2.16 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
V7769	VME 6U	Intel Core 2 Duo @ 2.16 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
CR11	CPCI 6U	Intel Core Duo @ 2.0GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
CR12	CPCI 6U	Intel Core i7 up to 2.53 GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-x86: VxWorks, Linux
VG6	VME 6U	Freescale 8641D @ 1.33GHz	Generic platform support in 5.0; Ethernet only; Linux, VxWorks	AXISLIB-PPC: VxWorks, Linux, LynxOS

MANY CORES ON A SINGLE DEVICE

GPGPU

What started out as a technology to enable graphics capabilities for video games has turned out to be a revolutionary way to effectively use hundreds of cores on a single device for certain military and aerospace applications.

General Purpose computation on Graphics Processing Units (GPGPUs) were developed as graphics chips for pixel processing, but subsequent development environments such as Compute Unified Device Architecture (CUDA) and OpenCL have leveraged the cores' Single Precision (SP) floating-point data processing capabilities for radar processing and other military and aerospace applications.

GPGPU devices do not have the large need for transistors and die space of their GPP counterparts. Thus, GPGPUs have the ability to provide a large number of processing cores on a single device at a minimum of size, weight and power (SWaP).

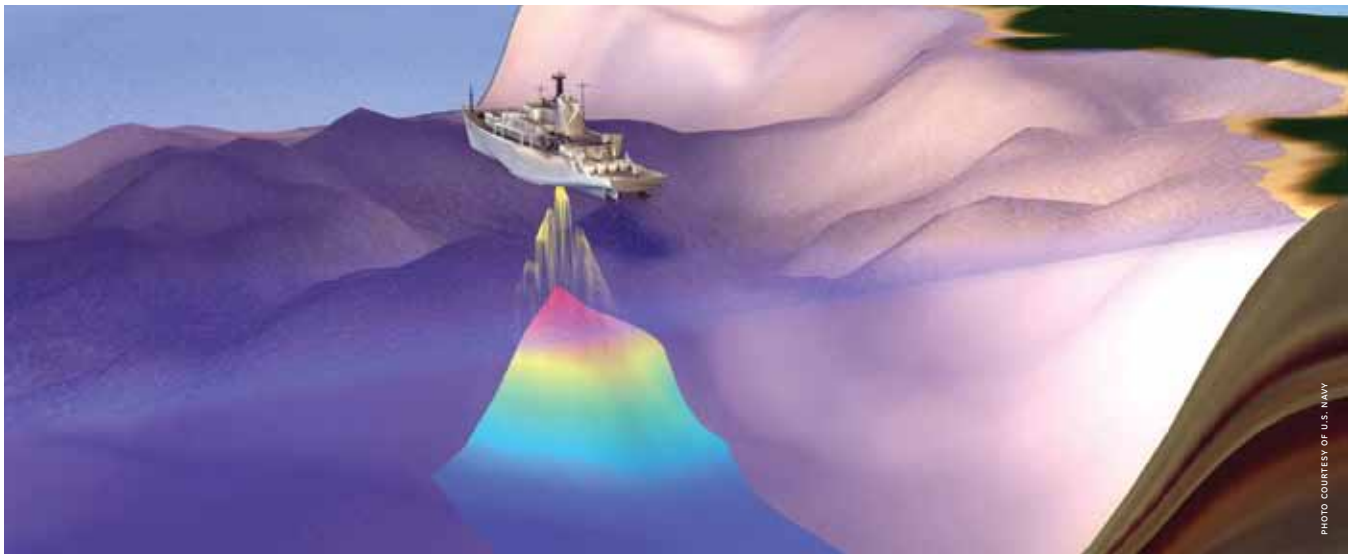
GE Intelligent Platforms provides GPGPU devices designed to withstand the harsh environments encountered in military and aerospace situations while delivering greatly improved systems performance. For instance, GPGPU ruggedized devices in radar systems can deliver greater range, number of targets, and speed while standing up to extreme temperatures, dust, shock and vibration.

Developing new military and aerospace GPGPU products with minimal SWaP is made easier as a result of a unique partnership between GE and NVIDIA, whose graphics processing units are based on the CUDA architecture.

In addition to mainstream libraries, GPGPU application development is enhanced by GE's AXIS advanced integrated multiprocessor software. The AXISLib-GPU software provides the industry-standard Vector, Signal and Image Processing Library (VSIPL) for NVIDIA-based GPU platforms. DSP application developers are able to quickly develop applications through the VSIPL API model without the need to learn GPU programming. AXISLib-GPU supports the development of high-performance DSP and multiprocessing applications on GE's platforms such as the IPN250, NPN250 and GRA111 graphics boards. These platforms have been deployed for radar, sonar, image processing, signals intelligence and intelligence, surveillance and reconnaissance (ISR) applications.

GE Intelligent Platforms' AXIS multiprocessing software suite also facilitates the development of complex applications over multiple clusters of GPU platforms. AXISFlow provides a communications API for multi-threaded, multi-core and multi-processor communications. Our AXISView provides a set of GUI tools for system visualization, application instrumentation, debugging and monitoring, allowing the developer to speed the process of timing the applications for the best real-time performance on the chosen system.

	Form Factor	Chip Set	I/O	Cooling	Conformal Coating	Extended Temperature Range
IPN250	VPX 6U	NVIDIA GT 240 CUDA Capable Graphics Processor	DVI, HDMI, VGA, GbE, PCIe, USB, SATA, GPIO, Audio, TV Input , Serial	Air, Spray & Conduction	Option	■
NPN240	VPX 6U	NVIDIA GT 240 CUDA Capable Graphics Processor	DVI, HDMI or DV1, VGA	Air, Spray & Conduction		■
MAGIC1	3U Boxed, VPX 3U	NVIDIA G73 with an Intel Core 2 Duo @ 2.16 GHz or 1.5 GHz, NVIDIA GT 240 CUDA Capable Graphics Processor	DVI, Gigabit Ethernet, USB, VGA	Base-plate	Yes	■
GRA111	VPX 3U	NVIDIA GT 240 CUDA Capable Graphics Processor	DVI, NTSC, PAL, RS-170, VGA	Air & Conduction	Option	■



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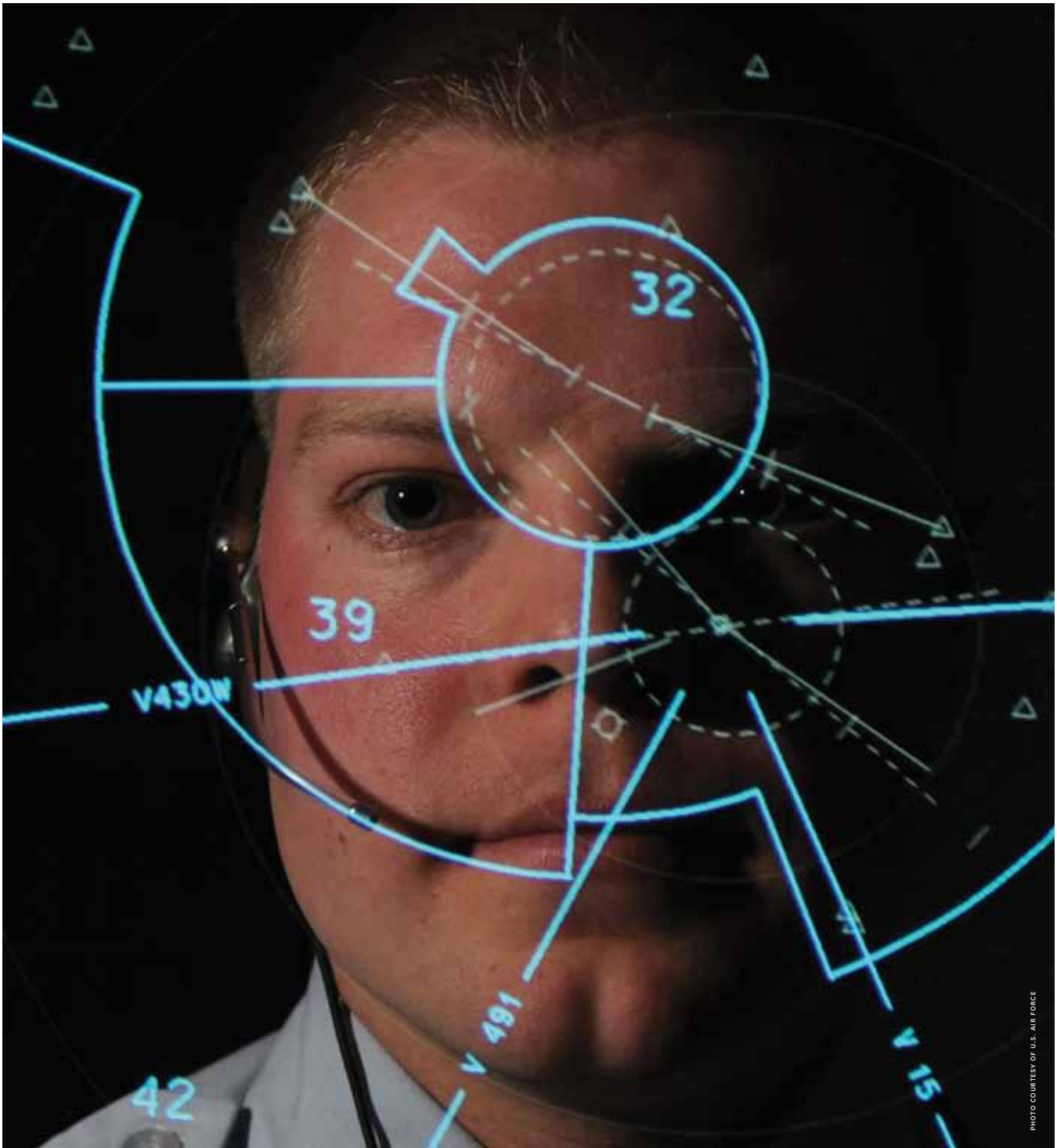
FPGA PROCESSORS

XMCV5 is the first rugged XMC to harness the power and flexibility of all three Virtex-5 FPGA families with build options for the Virtex-5 FX100T, SX95T and Virtex-5 LX110T enabling customers to field the right solution and address the complete range of performance requirements for demanding defense and aerospace applications. Together with our latest PowerPC and INTEL architecture processors, XMCV5 offers the right balance between hardware oriented FPGA optimized computing and software based application code running on the host platform.

	Form Factor	Processors	Memory	Mezzanine	Ethernet	Ruggedization	Description
XMCV5	XMC	Virtex-5 FX100T, SX95T or LX110T	512 MB/ 144 MB	XMC	Gigabit Ethernet	Level 1-5 Air, Conduction Cooled	Rugged XMC Virtex-5 processor with QDR2 & DDR2 memory harness' the power and flexibility of the Virtex-5 FXT with build options for SXT and LXT addressing the performance requirements for demanding defense & aerospace applications.



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DEVELOPMENT STARTER KITS

Our 3U and 6U VPX starter kits are available for quick and easy start up of CUDA-based systems, either for evaluation and benchmarking or to develop a specific application. They provide system integrators with a complete applications development platform supporting multiple GPGPU configurations.

	Product Description
3U VPX Starter Cage	The SCVPX3U is a five-slot 3U VPX starter enclosure addressing the requirements of VPX development. By using this as a development system, the integrator can significantly reduce time-to-market by developing the application on the actual system hardware while the final "rugged" system is being manufactured in parallel.
6U OpenVPX CUDA Starter Kit	The 6U OpenVPX CUDA Starter Kit provides system integrators with a complete application development platform supporting multiple GPGPU configurations. Customers can order a single part number and start development and testing on GE's latest IPN250 single board computer with onboard Intel Core2 Duo processor and NVIDIA GT240 GPU.
6U OpenVPX Development Chassis	The 6U OpenVPX Development Chassis is a rack-mountable lab chassis designed to support fast prototyping of multi-board 6U OpenVPX systems. The starter chassis provides a four-slot uncommitted backplane, ATX power supply, four hard-disk drives and variable speed fans. Each pay load slot is routed to a dedicated fabric interface routing the P1 data, and P2 expansion planes to rear transition modules. In addition, each pay load slot provides a direct interface to the P3 to P6 user I/O of the processor card via its own rear transition module. This innovative concept enables a variety of multi-board/multi-node processor configurations during system design and applications development. Multiple architectures can be defined and demonstrated with GE's deployable COTS boards to identify optimal configurations even before decisions are made about the SWaP profile of the final platform. The development chassis can accomodate a range of GE's COTS processor and I/O modules, including our latest OpenVPX Intel, NVIDIA and high speed fabric switch cards.

FABRIC SWITCHES

GE Intelligent Platforms processor and I/O boards benefit from a range of widely used network interface controllers (NICs) and switch fabrics to provide best-in-class high performance embedded computing (HPEC) capabilities. Serial switched fabrics provide the interprocess communication (IPC) backbone for the latest COTS modules in various form factors including the VITA41 (VXS) and VITA65 (OpenVPX) standards. High performance computing (HPC) architectures depend on fabrics such as PCIe, 10Gigabit Ethernet, Infiniband and Serial RapidIO (sRIO) and Starfabric supporting system scaling and I/O to address the demands of todays' 24/7, always-on, information age and GE-IP supports these architectures with a family of rugged, deployable switch fabric modules (SFMs) and software such as our AXIS Advanced Multiprocessor Integrated Software under a variety of operating systems.

	Form Factor	Mezzanine	Fabric Interface	Ruggedization	Operating System (OS) Support	AXIS-Enabled
PEX430	VPX 3U	1 x PMC/XMC	PCIe	Air cooled rugged, Conduction Cooled	N/A	
NETernity™ GBX460	VPX 6U	Yes	10GE	Level 1-5 Air, Conduction Cooled	N/A	
StarSwitch2	VME 6U	2 x PMC	StarFabric	Level 1-5 Air, Conduction Cooled	VxWorks	■
PEX440	VPX 6U	2 x PMC/XMC	PCIe	Level 1-5 Air, Conduction Cooled	N/A	■
CRX800	VXS 6U	None	sRIO	Level 1-5 Air, Conduction Cooled	VxWorks	■
PMC-StarLite	PMC	None	StarFabric	Level 1-5 Air, Conduction Cooled	VxWorks	■

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JAMES E. SHRYNE III, CIV, USAF

SENSOR PROCESSING

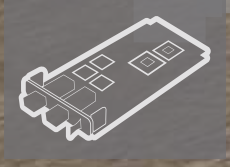
GE Intelligent Platforms is a leading provider of analog input and output boards and subsystems for a variety of military and aerospace sensor processing applications.

We take pride that our state-of-the-art software defined radio products are helping to expand the frontier of this technology that is revolutionizing the RF paradigm by placing data converters as close as possible to antennas. We provide a family of open architecture modules that include large-capacity FPGA devices for customer-specific sensor processing in PCIe, XMC/PMC and VPX formats. Applications for these modules include radar, communication, electronic warfare, signal intelligence, cellular base stations, and RF test equipment.

GE was one of the first companies to offer COTS products for acoustic applications such as sonar, vibration analysis, and test and measurement. Products today include popular bus types such as PCI/PCIe and CompactPCI. These acoustic products provide important functionalities such as simultaneous sampling across multiple channels, including channels that span multiple cards. Our revolutionary DaqNet 192-channel 1U acoustic I/O server provides high performance, higher channel density and simple integration at a very competitive price per channel.

Our video processing products provide data capture, processing, storage, compression, decompression, and display capabilities for a wide range of embedded video applications in military, aerospace and unmanned vehicles. Through the use of high-performance FPGA and DSP technologies, our products are able to deliver the high level of performance and ease-of-use required by these demanding applications.

GE Intelligent Platforms has just released the SPR870A ultra-wideband digital receiver/exciter, digital RF memory module. This revolutionary 3U VPX product uses class-leading ADCs and DACs to provide superior analog performance in radio and radar installations. The SPR870A's massively parallel onboard Virtex-6 FPGA processor affords near-real-time generation of transmit waveforms based on those it receives. Deep onboard memory allows precisely controlled signal recording and playback.



SOFTWARE DEFINED RADIO

Software Defined Radio is an enabling technology that is revolutionizing the RF world by placing the data converters as close to the antenna as possible. GE Intelligent Platformsis at the forefront of this advanced technology with a family of state-of-the-art open architecture modules that include large capacity FPGA devices for customer-specified signal processing functions (available in PCIe, XMC/PMC and VPX formats). These modules can be used for a wide range of applications, including radar, communications, electronic warfare, signal intelligence, cellular base stations, RF test equipment and the like.

	Memory	Function	Max. Sampling/ Conversion Frequency	Channels	Resolution	Form Factor	User Programmable FPGA	Ruggedization
SPR870A	1.5 GB	Transceiver (Analog Input & Output)	1.5 GHz/ch.	2 in, 2 out	10 & 12-bit	VPX	Virtex-6 XC6VSX475T	Level 1-5 Air, Conduction Cooled
ICS-554	1 MB	Receiver (Analog Input)	105 MHz/ch.	4	14-bit	PMC	Virtex-II XC2V1000, Virtex-II XC2V3000	Commercial (benign)
ICS-8551		Receiver (Analog Input)	1.5 GHz/ch. and 3 GHz/ch.	2 or 4	8-bit	XMC/PMC	Virtex-4 XC4VFX60	Level 1-5 Air, Conduction Cooled
ICS-8553		Receiver (Analog Input)	1.5 GHz/ch. and 3 GHz/ch.	2 or 4	8-bit	XMC/PMC	Virtex-4 XC4VFX60	Level 1-5 Air, Conduction Cooled
ICS-8554D	2 MB	Receiver (Analog Input)	105 MHz/ch.	4	14-bit	PMC	Virtex-II XC2V3000	Level 1-5 Air, Conduction Cooled
ICS-8552B	2 MB	Receiver (Analog Input)	105 MHz/ch.	2	14-bit	PMC	Virtex-II XC2V3000	Level 1-5 Air, Conduction Cooled
ICS-8554B	2 MB	Receiver (Analog Input)	105 MHz/ch.	4	14-bit	PMC	Virtex-II XC2V3000	Level 1-5 Air, Conduction Cooled
ICS-572	64/8 MB	Transceiver (Analog Input & Output)	105 MHz/ch. (Rx), 200 MHz/ch (Tx)	2 in, 2 out	14-bit	PMC	Virtex-II XC2V4000, Virtex-II XC2V6000	Commercial (benign)
ICS-8550		Receiver (Analog Input)	210 MHz/ch.	2	12-bit	PMC	Virtex-4 XC4VFX60	Level 1-5 Air, Conduction Cooled
ICS-1650	16 MB	Receiver (Analog Input)	250 MHz/ch.	4	12-bit	PCI Express	Virtex-5 V5SX95T	Commercial (benign)
ICS-1556	16 MB	Receiver (Analog Input)	400 MHz/ch.	4	14-bit	PMC	Virtex-5 V5SX95T	Commercial (benign)
ICS-1555	2 MB	Receiver (Analog Input)	160 MHz/ch. or 180 MHz/ch.	4	16-bit	PMC	Virtex-5 V5SX95T	Commercial (benign)
ICS-8561		Transmitter (Analog Output)	400 MHz/ch.	2	16-bit	PMC	Virtex-4 XC4VFX60	Level 1-5 Air, Conduction Cooled

ACOUSTIC PRODUCTS

GE Intelligent Platforms was one of the first companies to offer Commercial-Off-The-Shelf (COTS) products for acoustic applications that include sonar, vibration analysis and test and measurement, and combines the ultimate in analog and digital technologies. It spans the popular bus types, such as PCI/PCIe and CompactPCI, and offers the powerful features which are key to acoustic applications. These important features include simultaneous sampling across a large number of channels (including channels that span multiple cards) plus reliability/redundancy features for 24/7/365 operation. We continue to invest in new products such as the revolutionary daqNet acoustic acquisition server, which provides high performance, higher channel density, and simpler integration - all at a very competitive price per channel. As a result, regardless of your application in acoustic data acquisition, GE Intelligent Platforms has products that will meet your needs.

	Memory	Function	Max. Sampling/ Conversion Frequency	Channels	Resolution	Form Factor
ICS-1620	16 MB	Analog Output	2.5 MHz/ch.	16	16-bit	PCI Express
ICS-1640	16 MB	Analog Input	2.5 MHz/ch.	16	24-bit	PCI Express
ICS-645D	16 MB	Analog Input	2.5 MHz/ch.	32	16-bit	PCI
ICS-645B	16 MB	Analog Input	20 MHz/ch.	32	16-bit	PCI
daqNet	256 MB	Analog Input, Analog Output & Digital I/O options	625 kHz/ch.	192 Analog & 240 Digital	24-bit	1U Rackmount
ICS-710	4 - 16 MB	Analog Input	216 kHz/ch.	32	24-bit	CPCI 6U
ICS-625B	4 - 16 MB	Analog Output	288 kHz/ch.	32	24-bit	PCI
ICS-725	4 - 16 MB	Analog Output	288 kHz/ch.	32	24-bit	CPCI 6U
ICS-8500	8 MB	FPDP/FPDP II Receiver & Transmitter				PMC
ICS-500 R/T	8 MB	FPDP/FPDP II Receiver & Transmitter				PMC

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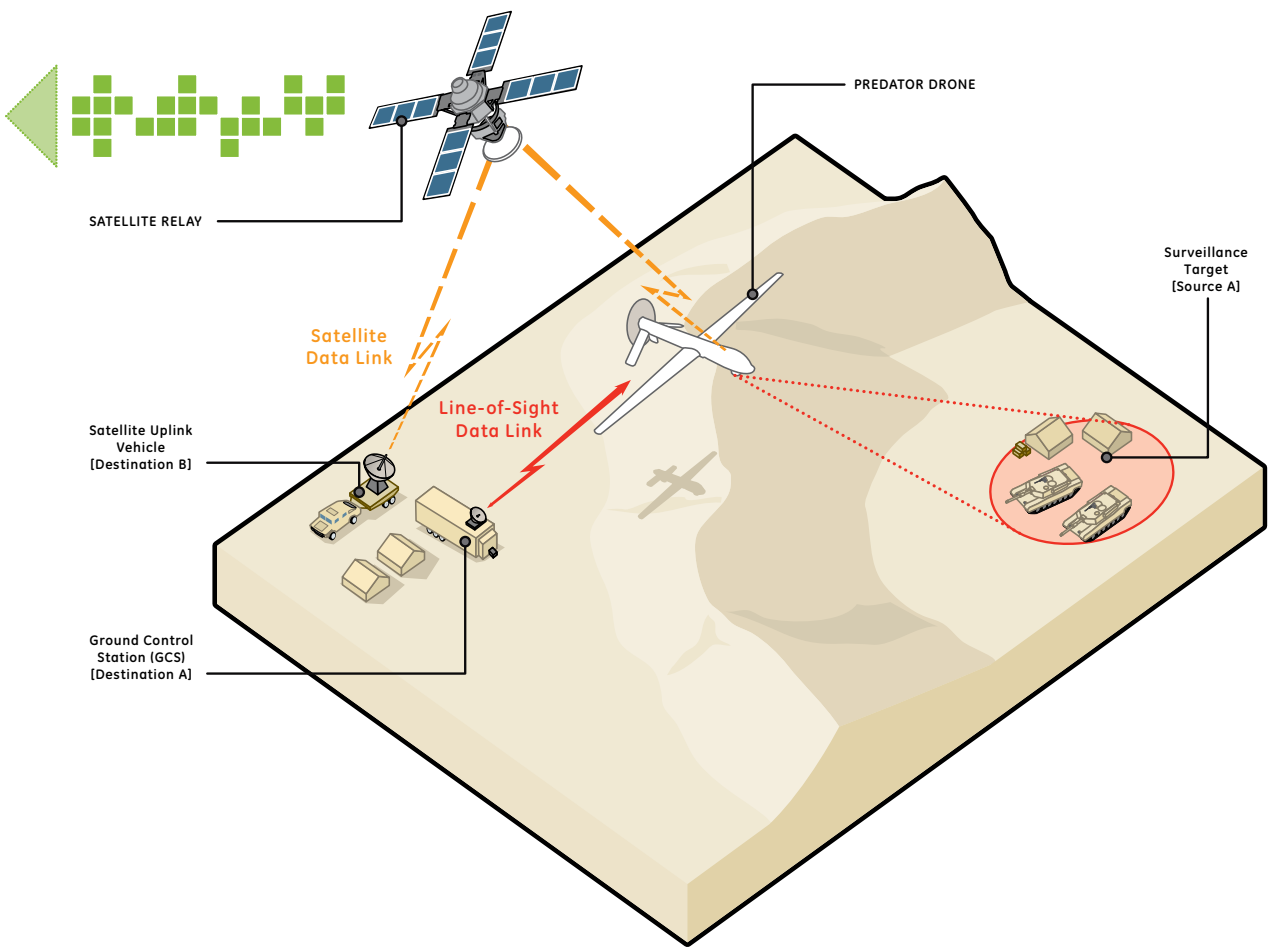
Video Compression

As real-time video becomes an increasingly important decision-making tool for military and security platforms such as unmanned vehicles and border security, so too does the need to be able to transmit and record high-definition video feeds at increased frame rates. With an increase of up to 12 times the amount of data (compared to standard definition video feeds) now required to squeeze through the same narrow bandwidth network, video compression has become a necessary tool to accomplish this data-gathering mission.

GE Intelligent Platforms offers video compression boards that provide a range of scalability, latency, and size, weight and power (SWaP) specifications. The most widely used video compression codec, H.264, provides the most effective blend of high-quality video while achieving better than 95% compression rates. It was around this codec that we based our latest XMC module, the ICS-8580. This module takes video compression to a new level with low-bandwidth, low-latency, and high-quality video from high-definition sources. Despite its low power requirement, the easy-to-use ICS-8580 is the most powerful embedded video compression/decompression engine on the market, boasting flexible video input and output support, data connectivity and bandwidth management capability.

This small-yet-rugged module is deployable in the harsh environments encountered by military and aerospace platforms such as unmanned aerial vehicles. The module can capture from a variety of video inputs, merge audio and other external data, and then send compressed streams across a network for processing or storage. The ICS-8580 can also be configured as a decompression engine and display the uncompressed video on local displays. The ICS-8580 can support two high-definition video streams or four standard-definition streams. Latencies of less than 75ms can be reliably achieved, with 50ms achievable in some instances.

The ICS-8580 supports many system connectivity options, including a stand-alone mode that removes the need for a single board computer. As a result, the surveillance platform is less complex and saves valuable SWaP while potentially increasing the video capabilities needed to carry out its mission. To quickly adapt to changing system requirements, this flexible video compression board can implement different compression codecs (such as JPEG2000) by simply updating the software configuration.



VIDEO PRODUCTS

We offer state-of-the-art video processing solutions for embedded video applications in military, aerospace and unmanned vehicle markets. Our video solutions provide data capture, processing, storage, compression, decompression, and display capabilities for a wide range of applications. Using high-performance FPGA and DSP technology, our solutions deliver the performance and ease-of-use required in these demanding environments.

	Form Factor	Chip Set	I/O	Cooling	Conformal Coating	Extended Temperature Range
ICS-8580	XMC	Arria II GX FPGA, TI TMS320DM6467 DSP	Analog Video, Digital Video, PCIe, Ethernet	Air, Spray & Conduction	Option	Yes
TS-PMC-3001	PMC	Altera Stratix FPGA	PMC P4	Air & Conduction	Option	Yes
TS-VID-MP4	PMC	Altera Stratix FPGA	Ethernet , RS-170	Air & Conduction	Option	Yes
TS-IX-RS01	PMC		RS-170	Air & Conduction	Option	Yes
TS-VDK-MPEG4				Air & Conduction	Option	Yes
TS-IX-RSF01	PMC		RS-170	Air & Conduction	Option	Yes
TS-DK-ITK		Altera Stratix FPGA		N/A	N/A	N/A
TS-IX-LV01	PMC	LVDS Buffers	LVDS	Convection or Conduction	Option	Yes

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MC1 KIM MCLENDON

APPLIED IMAGE PROCESSING

Whether for unmanned aerial vehicles (UAVs), air-to-ground, ground-to-air, ground-to-ground, naval tracking, remote control gun platforms, or range instrumentation applications, GE Intelligent Platforms is at the forefront of applied image processing technologies. We are particularly renowned for our rugged, real-time image processing subsystems and commercial off-the-shelf (COTS) video tracking and image processing systems for the military and aerospace arena.

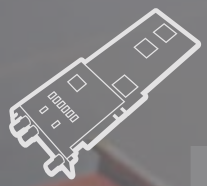
We have more than two decades of experience developing individual boards as well as fully integrated systems for real-time video image processing. Our systems are able to extract the maximum amount of useful information from a raw video data feed and deliver it to users in a manageable form for the highest level of electro optical system performance.

Almost all of our applied image processing products use COTS products to provide the latest commercial technologies that are able to meet interface and performance requirements without major modifications. The end result is optimal performance from a product that maximizes size, weight and power (SWaP) considerations.

Our array of ADEPT image processing modules has been optimized for data extraction in tasks such as image enhancement, target detection/acquisition, target tracking and system support functions across the full range of military electro optical system applications.

Visualization of video streams is often plagued by camera platform vibrations than make it difficult if not impossible for operators to glean meaningful information from the scene that is presented to them. GE's real-time image stabilization system is able to electronically remove global motion from a video stream without the SWaP losses inflicted by mechanical inertial stabilization methods.

Operators also benefit from the image fusion algorithm embedded into our applied image processing systems. This tool allows multiple feeds from sensitive to color visible, intensified visible, near-infrared, thermal infrared and tera hertz imagers and fuse the images into a single, meaningful image from which the operator can most effectively assess the scene. In addition, our warp engine affords rotation, scaling, and translation for each video source to compensate for image distortion and misalignment between imagers.



VIDEO TRACKING AND IMAGE PROCESSING

Our automatic video trackers and image processors are at the heart of a wide range of commercial, military and paramilitary systems where they provide the highest performance solutions in the smallest, fully environmentally proven hardware packages. A range of proven high-performance algorithms, which can be tailored for the application, allow real-time detection and tracking of targets within the video image which meet user-determined selection criteria. Other functionalities include real-time video fusion and video stabilization. GE's video tracking modules offer a wide range of video and data interfaces in order to offer total flexibility for integration with customer systems and are available in a range of physical formats allowing customers to add auto-tracking and image processing to standard subsystem configurations with the minimum of integration activity.

	Form Factor	Video Input Analog	Video Input Digital	Video Output	Control Interface	Serial Links
ADEPT3000 MINIATURE VIDEO TRACKER	Custom	NTSC/RS170 and PAL/CCIR (50/60Hz)	N/A	RS170/CCIR	2 off RS232, TTL, asynchronous	RS232
ADEPT5000 MULTI-TARGET VIDEO TRACKER	Custom, PC/104, PCI Express, VME 3U, VME 6U, VPX 3U	CCIR, PAL or RS170, NTSC	CameraLink, DVI-D, GigE Vision, HDSDI	CCIR, PAL or RS170, NTSC, DVI-D	Ethernet, RS232/RS422, USB	RS232/422, USB
ADEPT74 AUTOMATIC VIDEO TRACKER	PCI Express	NTSC/RS170 and PAL/CCIR (50/60Hz)	DVI-D	Composite, DVI-D	PCIe	RS232/422
ADEPT105 AUTOMATIC VIDEO TRACKER	CPCI 3U	NTSC/RS170 and PAL/CCIR (50/60Hz)		NTSC/RS170 and PAL/CCIR (60/50Hz)		RS232/422
ADEPT104 AUTOMATIC VIDEO TRACKER	PC/104-Plus	NTSC/RS170 and PAL/CCIR (50/60Hz)	CameraLink Optional	RS170/CCIR	PCI/ISA	RS232/422
ADEPT60 AUTOMATIC VIDEO TRACKER	VME 6U	NTSC/RS170 and PAL/CCIR (50/60Hz)	16-bit parallel	RS170/CCIR	VME DC analog	RS232/422
AIM12 AUTOMATIC VIDEO TRACKER	Standalone	NTSC/RS170 and PAL/CCIR (50/60Hz)	CameraLink Optional	RS170/CCIR		RS232/422
IMP20 IMAGE PROCESSING MODULE	Mezzanine	NTSC/RS170 and PAL/CCIR (50/60Hz)	Various	RS170/CCIR		
VDB30 VIDEO ROUTING SWITCHER	VME 6U	NTSC/RS170 and PAL/CCIR (50/60Hz)		RS170/CCIR	VME	RS232/422
IPS510 IMAGE PROCESSING SYSTEM		NTSC/RS170 and PAL/CCIR (50/60Hz), up to 12		RS170/CCIR		RS232/422

PHOTO COURTESY OF U.S. AIR FORCE

REAL-TIME PANORAMIC VIDEO

360° Situational Awareness

Warfighters need to know what is happening all around them and the military assets they control, and a variety of image processing systems from GE Intelligent Platforms can enable just that. Our situational awareness subsystems are found on virtually every type of military platform, including armored vehicles, aircraft, remote unmanned platforms, and security and surveillance installations.

Our subsystems can provide real-time 360° situational awareness through high-resolution panoramic video feeds from as many as 16 cameras. These subsystems provide an intuitive, operator-friendly interface that incorporates a virtual camera that can be panned or zoomed with either joystick or touch-screen interfaces. The virtual camera concept eliminates the critical time that would be lost by moving a real camera into position. The subsystem also operates with a wide array of physical sensor positions and orientations.

The video perspective afforded by the camera array affords a very high typical horizontal resolution of about 7,000 pixels. This provides much greater resolving power than fish-eye lens systems, and also provides a more realistic image of the area under surveillance by preserving the intuitive spatial relationships of objects. Images are aligned without distortion, leaving straight lines straight when the operator views the image on the display.

The use of multiple cameras provides real-time monitoring of an area much larger than any single sensor system can provide. GE's ADEPT5000 Multi-Target Video Tracker can provide automatic moving target detection and metadata tagging in the video stream anywhere within the 360° horizon. The subsystems can interface with any type of video-style sensor, including thermal imagers, and can be used with analog video (CCIR/RS170) as well as digital video interfaces.

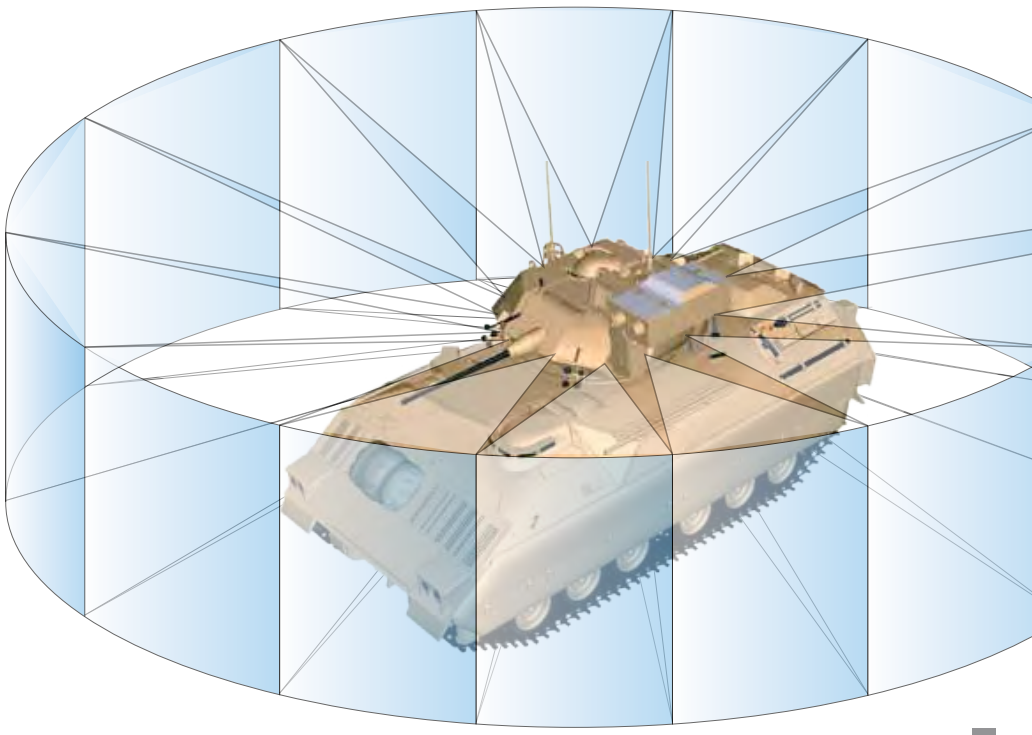
GE recognizes that size, weight and power (SWaP) must be conserved in many platforms in which situational awareness systems are deployed. Therefore, we designed our subsystems so that a single display device can manage multiple video input streams that provide the widest possible area of coverage.

The subsystems employ simple calibration and alignment algorithms. They can be operated with images covering any available waveband, and can be coupled with a cued or independent high-resolution steerable sensor. Our real-time Image Fusion technology can meld full-frame, multi-resolution images streaming from visible and infrared cameras to provide an enhanced image for operators even under sub-optimal viewing conditions. This intelligent subsystem affords higher detail and contrast than one sensor technology alone might provide, thus giving the operator a higher level of information content. The image processing subsystem can be divided into two modes. Data Extraction can provide the detection of events in the field of view, while Visualization offers the presentation of multiple video images and information from the Data Extraction process.

Future tracking subsystems may be expected to face even tighter SWaP constraints in certain platforms, such as UAVs. For these applications, tracking subsystems may drop certain non-critical functionalities in exchange for dramatically reduced SWaP specifications in addition to greater cost-effectiveness.

Another possible future development could be toward development of entire 360° situational awareness systems as package products to further ensure seamless integration between subsystems.

GE Intelligent Platforms 360° situational awareness subsystems are available for deployment in either fixed security installations where an industrial level of environmental performance is required or in mobile military vehicle or similar applications that require full-military, rugged, conduction-cooled environmental performance.



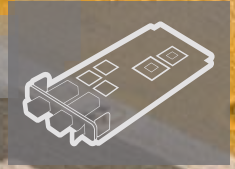
AVIONICS

GE Intelligent Platforms is the recognized leader in providing reliable data bus products that support the main aircraft interface technologies (MIL-STD-1553B and ARINC 429) that have been the standard for the past 50 years in the industry. We are also investing in supporting the new high-speed, determinist Ethernet-based technologies, AFDX/ARINC 664. Our wide range of products support many different interface technologies including new standards like PCIe, XMC, VPX, AMC and Express card and all products have driver support for many of the real-time operation systems. Our products are used in the development, simulation, test and maintenance of aircraft, space, weapons and ground systems. We also provide rugged and conduction-cooled boards for the demanding embedded environment, and are flying in many of today's military and commercial aircraft systems.

GE offers a complete product line of embedded products that supports MIL-STD-1553B. Our MIL-STD-1553 interface hardware provides the newest generation bus products using high-speed encoding and decoding with large onboard memory capacity. Our boards accurately buffer and record bus traffic with no data loss while simultaneously scheduling 1553 messages. Our FPGA products provide a long-term migration path, with in-field Firmware updates.

GE also offers a complete line of desktop and embedded products that support a wide variety of commercial avionics protocols, including ARINC 429/575/582, ARINC 561, ARINC 573/717, ARINC 453/708, and CSDB. All of our ARINC 429 products support maximum data throughput on all channels and most products provide on-board message scheduling, label filtering, multiple buffering options, time-tagging, error injection/detection and avionics-level I/O discretes. Ruggedized configurations with extended operating temperatures are optional.

GE Intelligent Platforms provides an AFDX/ARINC 664 part 7 product family that is ideal for data bus analysis of this next-generation avionics technology, which is a deterministic protocol for real-time applications over Ethernet media. This 100MB technology greatly increases the data throughput which in turn also helps to decrease cabling needs onboard aircraft thus reducing weight. This technology is currently being used on the new AirBus A380 and the Boeing 787 programs.



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SENIOR AIRMAN CLAY LANCASTER

MIL-STD-1553

We offer a wide range of intelligent MIL-STD-1553 interface hardware to meet demanding application needs. Our 1553 product line combines high-speed encoding/decoding, large onboard memory, intelligent protocol processing and advanced board-level functionality. This enables accurate buffering and recording of bus traffic with no data loss while simultaneously scheduling 1553 messages without host intervention.

To provide the best product support for our customers, GE Intelligent Platforms offers Product Lifecycle Management services for products that require long term support, are no longer recommended for new designs, or are discontinued.

	Form Factor	Application	Operating Mode	Analyzer	Temp Range	# Channels	Variable Voltage	IRIG Time Code Option
QPM-1553	PMC	CC, Lab, Rugged	Single/Full Function	BusTools	Com XT CC	1 to 4		■
EPMC-1553	PMC	CC, Lab, Rugged	Single/Full Function		Com XT	8		■
R15-AMC	AMC	Lab and Rugged, Simulation & Test	Single/Full Function	BusTools	Com XT CC	1, 2 or 4		■
RQVME2-1553	VME 6U	CC, Lab, Rugged	Single/Full Function	BusTools	Com XT	1 to 4	■	■
Q104-1553	PC/104, PC/104-Plus	Rugged	Single/Full Function	BusTools	Com XT	1 to 4		■
QPCX-1553	PCI	CC, Lab, Rugged	Single/Full Function	BusTools	Com XT	1 to 4	■	■
PCC-D1553	PCMCIA	Lab	Single/Full Function	BusTools	Com XT	1 to 2		■
R15-EC	Express Card	Lab and Rugged, Notebook Portable	Single/Full Function	BusTools	Com XT	1 or 2		■
RXMC-1553	XMC	Lab, Simulation, Test	Dual/Full Function	BusTools	CC and Extended	1, 2 or 4		■
RXMC2-1553	XMC	Lab, Simulation, Test	Single/Full Function	BusTools		1, 2 or 4	■	■
IP-D1553	IndustryPack	Lab	Single/Full Function	BusTools	Com XT	1 to 2		■
QCP-1553	CPCI 3U	CC, Lab, Rugged	Single/Full Function	BusTools	Com XT	1 to 4		■
RPCIE-1553	PCI Express	Lab, Rugged, Test	Single/Full Function	BusTools		1 to 4	■	■
R15-LPCIE	PCI Express, Low Profile	Lab, Rugged, Test	Single/Full Function	BusTools	Com XT	1 or 2	■	■

LABVIEW SUPPORT

LV-1553 software is the intergrating link between GE's MIL-STD-1553 interfaces and the National Instruments LabVIEW graphical environment. Low level programming is eliminated, and by using the G graphical language, user can quickly develop custom PC, PCI, cPCI, PCMCIA, VME and VXI-based test and simulation solutions that connect to MIL-STD-1553B avionics databuses.

10MBIT 1553

This advanced solution offers a less expensive architecture than regular 1Mbit 1553, while providing up to 10 times the data throughput. This interface is an excellent choice for flight controls, actuators, electro-pneumatic controllers or similar applications of standard 1553 requiring higher data rates.

	Form Factor	Application	Operating Mode	Temp Range	# Channels	IRIG Time Code Option	Coupling
PMC-MMSI	PMC	Lab, Rugged	Single	Com XT	12	■	Factory

Databus Analyzers

Our BusTools software provides a suite of tools for laboratory, in-flight, flight line or any other situation that requires real-time data acquisition and analysis.

Our BusTools-1553 v.7 provides a Microsoft Windows-based application for testing, analysis and simulation against the MIL-STD-1553 standard. BusTools-1553 harnesses the power of GE's hardware interfaces on the PCI, CompactPCI, PCMCIA, PC/104, PC/104-Plus, PC/AT, VME and VXI platforms for simplified control over simulation, display, data logging, playback, and protocol analysis of MIL-STD-1553/1760 A and B networks. BusTools-1553 also provides backward compatibility for reading and analysis of PASS3200 and PASS1000 log files.

Our BusTools/ARINC provides the only software solution for bus analysis, simulation, maintenance and data logging of the ARINC 429, 575, 561/6-wire, 717 and CSDB databus protocols. With comprehensive monitoring, data logging and simulation for 100 percent of bus loading activity, the user is able to simultaneously control, log and display data from a single Windows XP-, 2000-, or NT-based program on PCI, CompactPCI, PC/AT, PC/104 and PCMCIA platforms.

BusTools/AFDX provides a Windows XP- or 2000-based GUI application solution for traffic monitoring, analysis and simulation under the Avionics Full Duplex Switched Ethernet (AFDX) protocol. BusTools/AFDX, which can be used with our powerful CNIC interface, enables the user to view, log, analyze and generate AFDX traffic at the Adapter, End System, Virtual Link and Port levels.

GE Intelligent Platforms also offers two complete turnkey analyzers in an integrated package that includes an interface card, semi-rugged portable computer host and cables for immediate use without the bother of interrupts, driver conflicts and other integration issues. The BTP-1553 and BTP-AFDX both provide an intuitive GUI interface so that users can quickly monitor and analyze bus traffic and display multiple real-time engineering unit values and user-formatted graphs.

DATA BUS ANALYZERS

Our powerful avionics databus analyzer application software gives you simplified control over receive, transmit, logging and analysis functions. You can analyze bus traffic, quickly generate or modify messages and view received data in engineering units. Our BusTools provide a full suite of advanced features for use in the laboratory, in flight, on the flight line, or in any application requiring real-time data acquisition and analysis.

	Description
BTP-AFDX	AFDX Portable Analyzer - Complete Turnkey Analyzer System for Lab and Flight Line Test and Maintenance
BTP-ARINC	Complete Turnkey Analyzer System for Flight Line Test and Maintenance
BTP-1553	MIL-STD-1553 Portable Analyzer - Complete Turnkey Analyzer for Flight Line Test and Maintenance

	Description
BusTools-1553	Software support only available for Santa Barbara based cards. Contact factory for listing of supported products.
BusTools/ARINC	Software support only available for Santa Barbara based cards. Contact factory for listing of supported products.
BusTools/AFDX	Software support only available for Santa Barbara based cards. Contact factory for listing of supported products.

ARINC 615 DATA LOADER

The streamlined, single- or multi-session interface software provides intuitive Microsoft® Windows®-based ARINC 615-3/603 data loading. The single-session software loads one ARINC 615-3/603 compatible LRU at a time. The multi-session integrated hardware/software solution supports up to 16 simultaneous upload or download sessions with ARINC 615/603 compatible LRUs.

	Description
CEI-DL	Contact factory for software support and listing of supported products.

ARINC 429

Our ARINC solutions provide feature-rich functionality, ease of use and exceptional performance for embedded, test and simulation applications. Most interfaces offer individual channel programmability for source or sink, and an optional IRIG B receive time stamp. The PCI and PMC interfaces offer on-board transmit channel listen feature. They provide a user-friendly design to the host system with on-board management of transmission, receive, and data logging execution.

	Form Factor	Application	# Channels	Analyzer	Temp Range	IRIG Time Code Option	Protocol
CEI-500	PCI	Lab, Simulation	2 to 40		Com		Modular ARINC 419, 429, 453, 561, 568 6-wire, 573, 575, 582, 708, 717, CSDB, MIL-STD-1553, RS-232, RS-422, RS-485
RCEI-530	PCI	Lab, Simulation & Test	2 to 16	BusTools	Com XT	■	ARINC 429, 573, 575, 582, 717
RAR-PCIE	PCI Express	Lab, Simulator, Test	2 to 16	BusTools	Extended	■	ARINC 429, ARINC 573, ARINC 717
CEI-430	PC/104-Plus	Lab, Rugged, Simulation & Test	2 to 12	BusTools	Com XT		ARINC 429, 573, 575, 582, 717
CEI-715	PCMCIA	Notebook Portable	2 to 8	BusTools	Com		ARINC 429, 561, 568 6-wire, 573, 575, 582, 717, CSDB
RAR-EC	Express Card	Notebook Portable	2 to 7	BusTools	Com	■	ARINC 429, 573, 575, 582, 717
RAR-cPCI	CPCI 3U, CPCI 6U	Simulation & Test	2 to 16	BusTools	Com XT	■	ARINC 429, 573, 575, 582, 717
IP-CSDB	CPCI, PCI, VME, VXI	Simulation & Test	4		Com XT		CSDB
MAC - VXI	VXI	Lab, Simulation & Test	2 to 32		Com		Modular ARINC 419, 429, 453, 573, 575, 708, 717, RS-232, RS-422, RS-485
VME/VXI-MIO	VME/VXI	Lab, Simulation	2 to 32		Com		Modular ARINC 419, 429, 453, 561, 568 6-wire, 573, 575, 582, 708, 717, CSDB, MIL-STD-1553, RS-232, RS-422, RS-485
MAC - VME	VME	Lab, Simulation & Test	2 to 32		Com		Modular ARINC 419, 429, 453, 573, 575, 708, 717, RS-232, RS-422, RS-485
CEI-830	PMC	Lab, Rugged, Simulation & Test	2 to 16	BusTools	Com XT CC	■	ARINC 429, 575, 582
R830RX-32	PMC	Lab, Rugged, Simulation & Test	32	BusTools	Com XT CC	■	ARINC 429, 575, 582
P-708	PMC	Lab, Simulation	1 to 2		Com XT		ARINC 708
IP-429HD	IP	Lab, Rugged, Simulation & Test	2 to 8		Com		ARINC 429, 575, 582
IP-561A	IP	Lab, Simulation	1		Com		ARINC 561, 568 6-wire
IP-717	IP	Lab, Simulation	1		Com		ARINC 573, 717
IP-708	IP	Lab, Simulation	1		Com		ARINC 708

AVIONICS CORE

Our FlightCORE 1553 (FC-SMF) and FlightCORE 1553 (FC-GSK) leverage the capacity, performance and cost-effectiveness of programmable logic devices to provide a wide range of protocol communications options such as System on a Chip and integrated I/O. The rugged FlightCORE products afford a variety of configurations of IP Core, including lightweight, no-API-required, 1 MBit, 10 Mbit multi-drop, and 10 Mbit point-to-point MMSI, and can be operated in single or full-function modes.

AFDX ARINC 664

AFDX is a deterministic protocol for real time application on Ethernet media, also known as ARINC 664 Part 7. AFDX is intended for aircraft flight critical interfaces, including Engines, Flight Controls, Navigation Systems. With both hardware-based and software loadable AFDX, we support AFDX across evolving platforms to protect your avionics investment.

	Form Factor	# Channels	Processor Type & Speed	AFDX Stack	Ruggedization	Options/ Notes
CNIC-A2P	PMC	2	FPGA	AFDX / ARINC 664 protocol stack	Convection Cooled, Extended temperature	IRIG Support. BusTools/AFDX analyzer available.
CNIC-A2PX	PCI	2	FPGA	AFDX / ARINC 664 protocol stack	Convection Cooled, Extended temperature	IRIG Support. BusTools/AFDX analyzer available.
CNIC-A2P3	CPCI 3U	2	FPGA	AFDX / ARINC 664 protocol stack	Convection Cooled, Extended temperature	IRIG Support. BusTools/AFDX analyzer available.
CNIC-A2PF	CPCI 6U	2	FPGA	AFDX / ARINC 664 protocol stack	Convection Cooled, Extended temperature	IRIG Support. BusTools/AFDX analyzer available.
RAF-EC-2P	Express Card	2	FPGA	AFDX / ARINC 664 protocol stack		IRIG comes standard, BusTools AFDX and AIL compatible
CNIC-A2PU4	PCI Express	2	FPGA	AFDX / ARINC 664 protocol stack	Conformal Coating, Extended temperature	IRIG Support. BusTools/AFDX analyzer available.

BUILT TO ORDER

GE Intelligent Platforms is your partner for Avionics interfaces, including catalogue (COTS) and Custom and Build to Order products. Below are examples of Custom and Build to Order products. These products are application specific custom builds or software/hardware/configuration modifications from our COTS products and have pricing and delivery quoted per order. Please consult us by phone for your specialized needs.

	Form Factor	Application	# Channels	Operating Mode
PMC1553E	PMC	Lab and Rugged	1 or 2	
CORE-1553 (K-1553-R)	Custom	Rugged		Single/Full Function
CORE-1553 (CRT-1553)	Custom	Rugged		Single/Full Function

	Form Factor	Application	# Channels	Operating Mode
CORE-1553 (K-1553-FM)	Custom	Rugged		Single/Full Function
CORE-1553 (CFM-1553)	Custom	Rugged		Single/Full Function
CORE-1553 (CMS-1553)	Custom	Rugged		Single/Full Function

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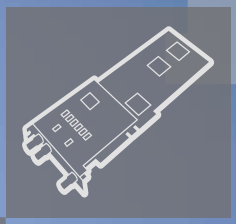
AIRMAN 1ST CLASS JASON EPLEY

IO AND COMMUNICATIONS

GE Intelligent Platforms has one of the most complete set of I/O products for the military and aerospace industry. We have a wide array of Ethernet switches as well and LAN cards. Other I/O interfaces offerings include packet processors, audio, video, storage, IndustryPack®, bus adapters, PCI Express®, Fibre Channel and StarFabric. In addition, our PMC card products are supplemented by our AdvancedMC™ cards for MicroTCA™ and AdvancedTCA™ systems.



Our new VME-6500 6U VME multifunction I/O board has the ability to provide analog and digital I/O functionality that typically required up to four board slots, thus significantly enhancing performance and functional density. The VME-6500 provides 8 analog and 16 digital inputs and outputs in a single 6U double Euro form factor. Each of the analog input channels is equipped with a 16-bit ADC, while each analog output channel has a 16-bit DAC. Flexibility of use is facilitated by the configuration of individual I/O from the VME host.

The VME-6500 can go beyond convention VME I/O board functionality through configuration to use onboard or external triggers for analog inputs. Analog outputs can also be configured to generate arbitrary waveforms.

Digital inputs can be configured to use selectable threshold voltages, while digital outputs can be configured as either current source or current sink outputs.

The VME-6500 represents the first in a series of VME multifunction I/O boards designed specifically to address the military and aerospace arena's growing constraints in size, weight and power. In addition, data acquisition is becoming an increasingly important requirement in applications such as radar, image capture and processing, and video tracking. The VME-6500 has been ruggedized for wide temperature ranges and to withstand shock and vibration so that it can be part of a data acquisition system that can be placed as close as possible to the sensors.

ANALOG IO

We offer a range of analog-to-digital and digital-to-analog converters designed for general purpose and industrial use.

	Form Factor	Channels	Function	Throughput	Channel Voltage Ranges
VME-6500	VME	8 Analog input, 8 Analog output, 16 Digital input, 16 Digital output	16-bit ADC 16-bit DAC	100 kHz	0-5V, 0-10V, ±5V, ±10V 4-20, 0-20, 0-25, 5-25 mA
VME-3113B	VME	64	12-bit ADC	33 kHz	0-10V, ±5V, ±10V
VME-3122A	VME	64	16-bit ADC	100 kHz	0-5V, 0-10V, ±2.5V, ±5V, ±10V
VME-3123A	VME	16	16-bit ADC	100 or 200 kHz	±5V, ±10V
VME-3125A	VME	16 differential or 32 single ended	12-bit ADC	40 kHz	0-10V, ±5V, ±10V
VME-3128A	VME	64	14-bit ADC	58 kHz	0-5V, 0-10V, ±2.5V, ±5V, ±10V
VMIVME-4116	VME	8	16-bit DAC	10 mS	±10V
VMIVME-4120	VME	16	12-bit DAC	1.7 mS	0-5V, 0-10V, ±2.5V, ±5V, ±10V 4-20, 0-20, 5-25 mA
VME-4132	VME	32	12-bit DAC	3.4 mS	0-5V, 0-10V, ±2.5V, ±5V, ±10V
VMIVME-4140	VME	32	12-bit DAC	10 mS	0-5V, 0-10V, ±2.5V, ±5V, ±10V
VME-4145	VME	4	16-bit DAC	400 nS	0-5V, 0-10V, ±2.5V, ±5V, ±10V
VME-4514A	VME	16	12-bit DAC	33 kHz, 1.7 mS	0-5V, 0-10V, ±2.5V, ±5V, ±10V
VMIVME-4905	VME	2	14-bit Digital-to-Synchro/ Resolver	DC to 1 kHz	6.81, 11.8, 40.0 V

CARRIER CARDS

Our carrier cards offer a range of I/O expansion solutions for CPCI, PCI, PMC and PC•MIP based systems.

	Form Factor	Capacity	Description
PEX440	VPX 6U	2 PMC/ XMC, 1 AFIX	VPX and VPX-REDI, also features non-blocking Gen 2 PCI Express switch with four x4 ports to the backplane
PEX441	VPX 6U	2 PMC / XMC	Rugged, COTS 6U dual XMC VITA46 carrier card designed to support high power mezzanine cards in both air cooled and conduction cooled systems.
PEX430	VPX 3U	1 PMC / XMC	Panel or chassis mount; SLR displays available
P0CC1	VME 6U	2 PMC	Dual PMC carrier in 6U VME form factor
PMC237	VME 6U	3 PMC	PMC expansion card for VME systems
EXP237	VME 6U	3 PMC / XMC	Optional Integrated ATI Radeon E2400 Graphics Processing Unit providing x8 PCIe video port with two XMC/PMC expansion sites (Two 133 MHz)
IMPCC1	CPCI 3U	1 PMC	Single PMC carrier for 3U CPCI PowerPact product family
CPMC1	CPCI 3U	1 PMC	Supports air and conduction cooling as well as front and rear I/O.
CPCI-100A-BP	CPCI 3U	2 IP	For 3U CompactPCI systems; has 2 IP sites and rear panel I/O

	Form Factor	Capacity	Description
DCPMC	CPCI 6U	2 PMC	A Dual CompactPCI PMC Carrier (DCPMC) card in a conduction-cooled or rugged 6U form factor.
DCPMC64	CPCI 6U	2 PMC	Rugged dual CompactPCI 64-bit PMC carrier module in 6U form factor.
ICS-7002	PCI	2 PMC	The ICS-7002A is a full length PCI card capable of carrying two single-width PCI Mezzanine Card (PMC) modules. It allows the User I/O (Pn4) connectors of the two sites to be interconnected, or to be connected to external equipment in a flexible fashion.
ICS-7003	PCI	2 PMC	ICS-7003 is the first PCI form factor dual PMC carrier with PCI Express interface. Compatible with x8 and x16 PCI Express slots in late model workstation and server PCs, the ICS-7003 provides unmatched data transfer performance.
ICS-7004	PCI	1 PMC	The ICS-7004 is a short form PCI Express carrier for PCI Mezzanine Cards (PMC) or Processor PCI Mezzanine Cards (PrPMC), compatible with four, eight and 16-lane interface connectors found in desktop and server PCs and workstations. It connects the User I/O connector of the module to a DIN connector on the carrier for easy interconnection.
PMC239/F	PCI		PMC239/F PCI to PMC Adapter with a fan

FIBRE CHANNEL HBAS

Fibre Channel host bus adapters and supporting software tools provide high sustained throughput, low latency, and industry standard multi-node connectivity.

	Bit Rate (Gb/s)	Form Factor	Half-Duplex Rate (MB/s)	Full-Duplex Rate (MB/s)	Media	Ports
Telum FC2432	4	AMC		Up to 1.6 Gb/s	Fiber	2

INTELLIGENT IO CONTROLLERS

Our firmware provides all required support for scanning inputs, updating outputs, EU and data-type conversions, fault detection, fault isolation, and error reporting.

	Function	Processors	RAM (Bytes)	Host Interface Options	Other
VME-9081	SBC for aircraft trainers	Intel Ultra-Low Voltage Celeron	128 MB	Reflective Memory, Ethernet, Embedded (IIOC as slave CPU)	Optional host software support package (VME/SW-IIOC2) provides extensive software library for use with customer's simulation software. Optional chassis configuration.
VME-9150	SBC for power plant control room simulators.	Intel Ultra-Low Voltage Celeron	128 MB	Reflective Memory, Ethernet, Embedded (IIOC as slave CPU)	Optional host software support package (VME/SW-IIOC2) provides extensive software library for use with customer's simulation software.

DIGITAL IO

For applications requiring reliable input and output of analog and digital signals, our digital I/O cards provide a variety of interfaces to connect to special function devices.

	Form Factor	Channels	I/O Voltage Range	Data Transfer Bits	Interface
VME-6500	VME	▪ 8 Analog input ▪ 8 Analog output ▪ 16 Digital input ▪ 16 Digital output	▪ Analog ± 10V or 0 to 25 mA ▪ Digital Input 1.25 to 66 VDC ▪ Digital Output 8 to 35 VDC	8, 16, 32, 64	Front I/O
VME-1111	VME	64 Input	1.25 to 66 VDC	8, 16, 32	Buffered inputs with debounce, Front I/O
VMIVME-1128	VME	128 Input	1.25 to 66 VDC	8, 16, 32	Buffered inputs, Front I/O
VMIVME-1129	VME	128 Input	1.25 to 66 VDC	8, 16, 32	Buffered inputs with debounce, Front I/O
VME-1150B	VME	64 Input	5 to 48 VDC	8, 16	Opto-isolated inputs, Front I/O
VMIVME-1160A	VME	32 Input	5 to 48 VDC	8, 16	Opto-isolated inputs, Front I/O
VME-1182A	VME	64 Input	5 to 60 VDC, 110, 240 VAC	8, 16, 32	Opto-isolated inputs, Front I/O
VMIVME-1184	VME	32 Input	5 to 34 VDC	8, 16, 32	Opto-isolated inputs, Backplane
VMIVME-2120	VME	64 Output	5 to 55 VDC	8, 16, 32	High-voltage buffered outputs, Front I/O
VME-2128	VME	128 Output	5 to 55 VDC	8, 16, 32	High-voltage buffered outputs, Front I/O
VMIVME-2131	VME	64 Output	8 to 35 VDC	8, 16, 32	High-voltage buffered outputs, Front I/O
VMIVME-2170A	VME	32 Output	5 to 30 VDC	8, 16	High-voltage opto-isolated outputs, Front I/O
VMIVME-2210	VME	64 Output	220 VDC, 250 VAC	8, 16, 32	Relay outputs, Front I/O
VME-2232A	VME	32 Output	220 VDC, 250 VAC	8, 16, 32	Relay outputs, Front I/O
VMIVME-2510B	VME	64 Input/Output	TTL	8, 16, 32	TTL Inputs/Outputs
VMIVME-2528	VME	128 Input/Output	TTL	8, 16	TTL Inputs/Outputs
VMIVME-2532A	VME	32 Input/32 Output	5 to 48 VDC	8, 16	TTL Inputs/Outputs
VMIVME-2533	VME	32 Output	RS-422/485	8, 16, 32	RS-422/485
VMIVME-2534	VME	32 Input/Output	1.25 to 60 VDC	8, 16, 32	High-voltage outputs & inputs, Backplane I/O
VMIVME-2536	VME	32 Input/32 Output	5 to 125 VDC	8, 16, 32	Opto-isolated outputs & inputs, Front I/O
VMIVME-2540	VME	24 Input/Output	RS-422, TTL	8, 16, 24, 32	RS-422
P-DIS	PMC	40 Input/Output	5 to 50 VDC	32	Additional 4 channels of TTL I/O, 1 PECL input, 1 PECL output
PIO-2	VME	32 Input/Output	5 to 48 VDC	8, 16	Opto-isolated inputs/outputs, Backplane I/O

ETHERNET INTERFACES

It is almost impossible to exaggerate the importance of high speed networking in most embedded applications. Our Ethernet cards are designed to relieve bandwidth bottlenecks and allow this technology to be rapidly incorporated into CompactPC®, VMEbus, AdvancedTCA® and MicroTCA™ applications. We offer PMC, PCI Edge, and AdvancedMC modules, and a range of supported speeds including Gigabit, 10/100TX and 100FX. Media types we support include copper and fiber. Connected styles include RJ45, LC, SC and ST and some variants are available in wide temperature and conduction cooled. Our Ethernet products can be supported by numerous operating systems such as Windows, Linux, Solaris and VxWorks, etc.

	Form Factor	Media	Port Count	Port Type	Front Panel I/O Connectors	Rear Panel I/O Connectors	PCI Controller/ Ethernet MAC	Description
Telum GE-QLX	AMC	Fiber	4	1000BaseLX	LC		Broadcom BCM5715SKPBG	AMC with 4 1000BaseLX Ethernet ports
Telum GE-QSX	AMC	Fiber	4	1000BaseSX	SC		Broadcom BCM5715SKPBG	AMC with 4 1000BaseSX Ethernet ports
PMC677RCTX	PMC	Copper	4	10/100/1000BaseT	RJ-45		Intel 82546	PMC with 4 Gigabit Ethernet ports
PMC615RC	PMC	Copper	4	10/100BaseTX		J4	Intel 82551ER	PMC with 4 10/100TX Ethernet ports
PMC-GBIT-DT2CC	PMC	Copper	2	10/100/1000BaseT		RJ-45	Intel 82546	PMC with 2 Gigabit Ethernet ports, rear I/O, conduction cooled.
PMC-GBIT-DT2BP	PMC	Copper	2	10/100/1000BaseT		RJ-45	Intel 82546	PMC with 2 Gigabit Ethernet ports, rear I/O
Telum GE-QT	AMC	Copper	4	10/100/1000BaseT	RJ-45		Intel 82571EB	AMC with 4 Gigabit Ethernet ports
PMC676RCTX	PMC	Copper	1 or 2	10/100/1000BaseT	RJ-45		Intel 82546	PMC with 2 Gigabit Ethernet ports, option to support Solaris and PXE LAN boot
PMC610RC	PMC	Copper	2 or 4	10/100BaseTX	RJ-45		Intel 82551ER	PMC with 4 10/100TX Ethernet ports, option for wide temperature versions.
PMC610J4RC	PMC	Copper	2 or 4	10/100BaseTX		J4	Intel 82551ER	PMC with 4 10/100TX Ethernet ports, rear I/O, option for wide temperature versions.
PMC677RCLC	PMC	Fiber	4	1000BaseSX	LC		Intel 82546	PMC with 4 1000BaseSX Ethernet ports, option for 1000BaseLX
PMC676RCSC	PMC	Fiber	1 or 2	1000BaseSX	SC		Intel 82546	PMC with 2 1000BaseSX Ethernet ports, option to support LC connectors, Solaris and PXE LAN boot
RM666FX	PCI	Fiber	2	100BaseFX	SC		Intel 82546	PCI Edge card with 2 100BaseFX ports, option for ST style connectors
PMC613FXRCSC	PMC	Fiber	1 or 2	100BaseFX	SC		Intel 82551	PMC with 2 100BaseFX ports, option for ST style connectors

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ETHERNET SWITCHES

Our Ethernet Switch product family offers an extensive number of switches providing maximum flexibility, performance, and density. We have experience with a broad range of application types, from telecom and networking to government and military. Form factors include VPX, cPCI, VME, VXS and PMC and many of these models come in air cooled, conduction cooled and packaged variants. Based on the model you chose, we offer a wide range of connections featuring: 10GigE (10GBaseKX4, 10GBaseCX4, 10GBaseSR, 10GBaseLR), GigE (1000BaseT, 1000BaseSX, 1000BaseLX), 100Mbps (100BaseTX, 100BaseFX) or even 10Mbps (10BaseT).

	Form Factor	Management Type	Port Count	Port Type	Description
NETernity™ CP923RC	CPCI 3U	Fully Managed Layer-2/3+	10	10/100/1000BaseT	3U CPCI Fully Managed Layer 2/3 Gigabit Ethernet Switch with 10 ports available in air cooled, rugged and conduction cooled versions. Support for IPv6 switching and routing.
RES-210 Rugged Ethernet Switch	3U	Fully Managed Layer-2/3+	10	10/100/1000BaseT	3U rugged, standalone; conduction cooled; 28VDC conduction cooled power supply; dimensions are 255.8 x 186 x 65.99 mm; weight is 4.25 pounds
NETernity™ CP3-GESW8N	CPCI 3U	Unmanaged Layer-2	8	10/100/1000BaseT	3U CPCI Unmanaged Layer 2 Gigabit Ethernet Switch with 8 ports and conduction cooled.
NETernity™ RM921N	VME 6U	Fully Managed Layer-2/3+	12 or 24	10/100/1000BaseT, 1000BaseSX, 1000BaseLX, 100BaseFX	6U VME Fully Managed Layer 2/3 Switch with 12 or 24 front panel ports that can be a combination of Gigabit Ethernet copper or fiber, or 100BaseFX. Support for IPv6 switching and routing.
NETernity™ CPX24	CPCI 6U	Fully Managed Layer-2/3+	24	10/100/1000BaseT, 1000BaseSX, 1000BaseLX	6U CPCI Fully Managed Layer 2/3 Gigabit Ethernet Switch with 24 Gigabit Ethernet ports plus two 10GigE XAUI ports. Gigabit Ethernet ports can be copper or fiber. Available in air cooled, rugged and conduction cooled versions. Support for IPv6 switching and routing.
GS24		Fully Managed Layer-2/3+	24	10/100/1000BaseT	Rugged Standalone Fully Managed Layer 2/3 or Unmanaged Gigabit Ethernet switch; base-plate cooled, IP65 rated; 28VDC power supply; dimensions are 100 x 300 x 235 mm; weight is 14.3 pounds. Support for IPv6 switching and routing. Option for two 10GigE ports.
NETernity™ GBX410	VPX 3U	Fully Managed Layer-2/3+	12	10/100/1000BaseT, 1000BaseSX or 1000BaseLX	3U VPX Fully Managed Layer 2/3 Switch with 12 Gigabit Ethernet ports plus 2 10GigE XAUI ports. Available in air cooled, rugged and conduction cooled versions. Support for IPv6 switching and routing. Option to add four GigE fiber ports.
TRCP9XXRC	CPCI 6U		24	10/100/1000BaseT	Transition module with 24 ports for NETernity™ CP921RC-300, CP980RC, and CP982RC
TRCP9XXRC-12	CPCI 6U		12	10/100/1000BaseT	Transition module with 12 ports for NETernity™ CP921RC-300, CP980RC, and CP982RC
TRCP9XX-5RC	CPCI 6U		5	10/100/1000BaseT	Transition module with 5 ports for NETernity™ CP921RC-300, CP980RC, and CP982RC
NETernity™ RM922RC	VME 6U	Fully Managed Layer-2/3+	24	10/100/1000BaseT	6U VME Fully Managed Layer 2/3 Switch with 24 Gigabit Ethernet rear I/O ports. Support for IPv6 switching and routing.
NETernity™ CP980RC	CPCI 6U	Unmanaged Layer-2	24	10/100/1000BaseT	6U CPCI PICMG 2.16 Unmanaged Layer 2 Gigabit Ethernet Switch with 24 ports. Option for 2 Copper GigE ports on front panel.
NETernity™ CP982RC	CPCI 6U	Managed Layer-2	24	10/100/1000BaseT	6U CPCI PICMG 2.16 Managed Layer 2 Gigabit Ethernet Switch with 24 ports. Option for 2 Copper or Fiber GigE ports on front panel.

We feature several management options, depending on model from Unmanaged or Managed Layer 2 to Fully Managed Layer -2/3+ switches. Unmanaged switches operate at Layer -2, with no operator interfacing and are designed for easy deployment in simple, well defined applications. Managed switches are available as Layer -2 only or Layer -2/3+ switches with control and monitoring capabilities via local or remote access. Our managed switches support a wealth of configuration options and protocol support, including multicast, broadcast, spanning tree, and VLANs. Fully Managed switches include both IPv4 and IPv6 switching and routing.

	Form Factor	Management Type	Port Count	Port Type	Description
NETernity™ GBX460	VPX 6U	Fully Manager Layer -2/3+	16,20 or 24	10GigE, Gigabit Ethernet	6U VPX Unmanaged Ethernet Switch with 20 10GigE Dataplane and sixteen 1 GigE Control Plane ports; option for up to 4 10gigE fiber ports on front panel. OpenWare support as a separate sentence.
TRCP9XX-5RC-F	CPCI 6U		5	10/100/1000BaseT	Transition module with 5 ports for NETernity™ CP921RC-300 with support for Failover Groups.
GS12		Fully Managed Layer-2/3+	12	10/100/1000BaseT	Rugged Standalone Fully Managed Layer 2/3 or Unmanaged Gigabit Ethernet Switch with IPv6 switching and routing supporting 12 Gigabit Ethernet ports.
NETernity™ CP921RC-30x	CPCI 6U	Fully Managed Layer-2/3+	24	10/100/1000BaseT, 10GigE	6U CPCI PICMG 2.16 Fully Managed Layer 2 Gigabit Ethernet Switch with 24 ports. Option for 2 10GigE plus 2 Copper or Fiber GigE ports on front panel. Support for IPv6 switching and routing.
TRRM940	VME 6U		8	10/100BaseTX	Transition module for NETernity™ RM940 switch
NETernity™ RM981RC	VME 6U	Unmanaged Layer-2	12 or 24	10/100/1000BaseT, 1000BaseSX, 1000BaseLX	6U VME Unmanaged Layer 2 Gigabit Ethernet Switch with either 12 or 24 front panel ports. Ports can be GigE copper, 1000BaseSX or 1000BaseLX.
NETernity™ RM980RC	VME 6U	Unmanaged Layer-2	12 or 24	10/100/1000BaseT	6U VME Unmanaged Layer 2 Gigabit Ethernet Switch with 24 ports. Option for 2 Copper GigE ports on front panel.
NETernity™ RM982RC	VME 6U	Managed Layer-2	12 or 24	10/100/1000BaseT	6U VME Managed Layer 2 Gigabit Ethernet Switch with 24 ports. Option for 2 Copper or Fiber GigE ports on front panel.
NETernity™ RM983RC	VME 6U	Managed Layer-2	12 or 24	10/100/1000BaseT, 1000BaseSX, 1000BaseLX	6U VME Managed Layer 2 Gigabit Ethernet Switch with either 12 or 24 front panel ports. Ports can be GigE copper, 1000BaseSX or 1000BaseLX.
NETernity™ CP981RC	CPCI 6U	Unmanaged Layer-2	12 or 24	10/100/1000BaseT, 1000BaseSX, 1000BaseLX	6U CPCI Unmanaged Layer 2 Gigabit Ethernet Switch with either 12 or 24 front panel ports. Ports can be GigE copper, 1000BaseSX or 1000BaseLX.
NETernity™ GBX24	VME 6U	Fully Managed Layer-2/3+	24	10/100/1000BaseT, 1000BaseSX, 1000BaseLX	6U VME Fully Managed Layer 2/3 Gigabit Ethernet Switch with 24 Gigabit Ethernet ports. Option for some gigabit Ethernet ports to be fiber. Available in air cooled, rugged and conduction cooled versions. Support for IPv6 switching and routing.
NETernity™ VXS24	VXS 6U	Fully Managed Layer-2/3+	24	1000BaseCX, 10/100/1000BaseT, 1000BaseSX, 1000BaseLX, 100BaseFX	VITA 41.3 Fully Managed Layer 2/3 Gigabit Ethernet Switch with 22 Gigabit Ethernet rear I/O ports. Option for 2 front panel ports which can be 1000BaseSX, 1000BaseLX, 100BaseFX or 10/100/1000BaseT. Available in air cooled, rugged and conduction cooled versions. Support for IPv6 switching and routing.
CP3-GESW8-TM8	CPCI 3U		8	10/100/1000BaseT	Rear transition module for Neternity™ CP3-GESW8 family switches

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DSP-BASED IO

Highly versatile, DSP-Based I/O products provide an interface between the cPCI or VME bus and a flexible array of inputs and outputs.

	Form Factor	Inputs	Outputs	Bidirectional	Temp (C)	Cooling
DIO1-cPCI-CC	CPCI 3U	▪ 8 Bi-Level Optically Coupled	▪ 8 Bi-Level Optically Coupled	▪ 16 Individually Programmable General Purpose TTL I/O	-40° to +85°	Conduction
DIO2-cPCI-CC	CPCI 3U	▪ 8 TTL Bi-Level Discrete	▪ 16 Discrete 300 mA 28 V ▪ 16 Discrete Open Collector Outputs ▪ 32 Discrete Source 28 V ▪ 8 TTL Bi-Level Discrete ▪ 1 Four Coil Stepper Motor	▪ 1 Analog Interface ▪ 8-Channel 10-Bit ADC for monitoring the power supply secondary voltages	-40° to +85°	Conduction
DIO3-cPCI-CC	CPCI 3U	▪ 32 0 to 28 Volt Discrete ▪ 4 Analog Frequency ▪ 11 High-Level Single Ended Analog ▪ 28 Low-Level Differential Analog ▪ 2 Frequency Gear Sensor	▪ 6 DC Programmable Analog -10 to +10V ▪ 4 Excitation +/-10 Volt	▪ 1 Analog Interface ▪ 8-Channel 10-Bit ADC for monitoring the power supply secondary voltages	-40° to +85°	Conduction
DIO4-cPCI-CC	CPCI 3U	▪ 24 Discrete Ground/Open 0 to 28 V ▪ 16 TTL Level Discrete ▪ 16 HLD Loopback	▪ 16 TTL Level Discrete ▪ 16 Discrete Ground/Open	▪ 1 Analog Interface ▪ 8-Channel 10-Bit ADC for monitoring the power supply secondary voltages	-40° to +85°	Conduction
DIO1-VME-CC	VME	▪ 120 A/D	▪ 104 General Purpose ▪ 8 Software Programmable ▪ 8 High Current		-40° to +85°	Conduction
DIO2-VME-CC	VME	▪ 2 50-kHz Serial Differential Inputs ▪ 20 High-Level 16-Bit Differential Analog	▪ 2 50-kHz Serial Differential ▪ 20 High-Level 16-Bit Differential Analog		-40° to +85°	Conduction
DIO3-VME-CC	VME	▪ 32 Analog-to-Digital Converter (ADC)	▪ 32 General Purpose Outputs ▪ 1 Tone Generator		-40° to +85°	Conduction
DIO1-6CP	CPCI 6U	▪ 16 HLD ▪ 16 TTL Level Discrete ▪ 16 HLD Loopback ▪ 16 Differential Logic	▪ 16 Differential Logic ▪ 16 Discrete Ground/Open ▪ 16 TTL Level Discrete;	▪ 1 Analog Interface ▪ 8-Channel 10-Bit ADC for monitoring the power supply secondary voltages	-40° to +85°	Conduction

GRAPHICS

We offer high-resolution, high-performance graphics I/O solutions for embedded video and display applications. Our graphics subsystems are based on high performance commercial chips for state-of-the-art image quality and capabilities.

	Form Factor	Chip Set	I/O	Cooling	Conformal Coating	Extended Temperature Range
MAGIC1	3U Boxed, VPX 3U	NVIDIA G73 with an Intel Core 2 Duo @ 2.16 GHz or 1.5 GHz, NVIDIA GT 240 CUDA Capable Graphics Processor	DVI, Gigabit Ethernet, USB, VGA	Base-plate	Yes	■
VIM2	Mezzanine	Virtex-4	TV, RGB, DVI	Air & Conduction	Option	■
GRA110	VPX 3U	NVIDIA G73 graphics processor	DVI, NTSC, PAL, RS-170, VGA	Air & Conduction	Option	■
GRA111	VPX 3U	NVIDIA GT 240 CUDA Capable Graphics Processor	DVI, NTSC, PAL, RS-170, VGA	Air & Conduction	Option	■
SE2	VME 6U	NVIDIA G73; Intel Core 2 Duo @ 2.16 GHz or 1.5 GHz	DVI, Gigabit Ethernet, VGA	Air & Conduction	Option	■
XMCGA6	XMC	NVIDIA G73 graphics processor	DVI-I, NTSC, PAL, RS-170	Air & Conduction	Option	■
Telum 3001	AMC	ATI M72-CSP128	DVI, VGA	Convection	Option	

INDUSTRYPACK MODULES

IndustryPacks (IPs) and transition modules offer mix and match functionality in a simple-to-use modular form for demanding applications of all types.

	Product Description
IP-488	Provides talker, listener, and controller access to the IEEE-488 instrumentation bus
IP-DAC	6 channels of 12-bit digital-to-analog conversion
IP-DIGITAL482	48 channels of TTL-level digital I/O, timers, handshakes; replacement for MC68230-based Ips
IP-DIO48-ET	48 TTL level tri-state digital I/O lines with pullups; interrupts; debounce; ESD
IP-DUALPIT2	32 channels of TTL-level digital I/O, timer I/O, timers, handshakes; replacement for MC68230-based IPs
IP-MP-SERIAL	2 EIA-232/422/485 high-speed synchronous serial ports
IP-OCTAL-232	8 EIA-232 asynchronous serial ports, each with RXD, TXD, RTS, CTS & GND signals; 3-level FIFOs; 8 general purpose inputs

	Product Description
IP-OCTAL-422	8 EIA-422 asynchronous serial ports, each with RXD, TXD & GND signals; 3-level FIFOs; 8 general purpose inputs
IP-OCTALPLUS232	8 channels of asynchronous RS232 115 kbaud serial interface; FIFOs; ESD protection
IP-OCTALPLUS422	8 channels of asynchronous RS422 460 kbaud serial interface; FIFOs; ESD protection
IP-OCTPLTTL-ET	8 channels of asynchronous TTL 460 kbaud serial interface; FIFOs; ESD protection; extended temperature range
IP-OPTOAD16BPV1	16 opto isolated, multiplexed 16-bit analog-to-digital channels with gain control 80 KHz; -40° to +85°C
IP-OPTOIO-8	8 optically isolated inputs; 8 optically isolated outputs
IP-PWI	3 pulse width input channels
IP-QUADRATURE	4 quadrature encoder input channels

	Product Description
IP-RELAY	8 latching form C relays
IP-UD	24 buffered TTL level I/O lines
IP-UD-D	24 differential I/O lines and EIA-422 differential interface
IP-UD-E	24 TTL level I/O lines, each with ESD protection circuitry
IP-UD-E-48	48 TTL level I/O lines, each with ESD protection circuitry
IP-UD-I	24 buffered TTL level I/O lines; interrupts
IP-UD-ID	24 differential I/O lines; EIA-422 interface; interrupts
IP-UD-IHV-16I8O	16 high-voltage inputs; 8 high-voltage outputs; interrupts
IP-UD-IHV-8I16O	8 high-voltage inputs; 16 high-voltage outputs; interrupts
IP-UNIV-SERIAL	High-speed dual channel synchronous serial ports with support for RS232 and RS422
XM-OCTAL	Transition module for IP-OCTAL; supports 2 OCTAL serial modules

ON-BOARD STORAGE

We offer a variety of hard disk adapters and Compact Flash/ MicroDrive Host Bus Adapters in the PMC form factor, including innovative PCMCIA flash and rotary disk options. We also offer an RoHS compliant Serial ATA AdvancedMC™ hard drive module.

	Function	Capacity	Form Factor	Ruggedization
SDD910	3U VPX SATA disk drive	Up to 128GB Rotating	VPX 3U	Commercial/ extended temperature
V7479	VME SATA DVD/CD-R/W with a SATA hard disk or Solid State Drive	Up to 200 GB Rotating Hard Drive; Up to 64 GB Solid State Disk	VME 6U	Commercial
PMCF3	Compact Flash/MicroDrive Host Adapter	Up to 6GB	PMC	Air cooled rugged, Commercial, Conduction cooled rugged, Extended temperature
Telum 200-SATA	Serial ATA Hard Disk Drive Module	Up to 200GB	AMC	Commercial
Telum 210 SAS	SAS hard drive and controller	Up to 300 GB	AMC	Commercial
PMC-0247RC	Serial ATA Hard Disk Drive Module or Solid State Drive	HDD up to 250GB; SSD up to 64GB	PMC	Commercial
VME-7469	VME IDE CD ROM or DVD drive with optional disk drive	Up to 100GB	VME	Commercial
RMCD	Rugged memory card drive	II or III; Slot 2: 1 Type I or II; Slot1:1 Type I	Standalone	Rugged

PACKET PROCESSORS : ADVANCEDTCA BLADES AND ADVANCEDMCS

It is increasingly important for network administrators to control network traffic in order to maintain both security and quality of service. Packet processors provide secure, high-speed connectivity and complex security processing at wire speed performance. With GE AdvancedTCA (ATCA) and AdvancedMC (AMC) Cavium OCTEON-based IP packet processors, you can quickly create applications such as Network Address Translators, Session Border Controllers, Media Gateways, Edge Routers, Firewall bricks and Video Services Switches that meet the demands of security conscious network administrators.

	Form Factor	Network Processor	Interconnect	DDR Packet Memory	Software Support
AT2-5800-10G	8U Single Slot ATCA	Dual OCTEON Plus CN5860-SCPs	10x 1000BaseT	Up to 16GB (DDR2) per processor	Carrier Grade Linux, LSP, POST, UBoot
Telum NPA-56512	AMC	OCTEON Plus CN5650	2x 10Gb Ethernet, PCI Express x8, 2x SATA	Up to 4GB (DDR2)	Debian Linux, LSP, POST, UBoot
Telum NPA-5854	AMC	OCTEON Plus CN5850-SCP	4x1000BaseT or 4x1000BaseSX	Up to 2GB (DDR2)	Debian Linux, LSP, POST, UBoot

MULTIFUNCTION IO

We offer a variety of highly reliable, high-performance I/O solutions for embedded computing applications.

	Description
MFIO-C6	6U CompactPCI multi-function I/O card with 8 analog inputs, 7 open collector 250mA outputs, 48 LVTTL I/O channels, 5 LVDS output ports, 2 LVDS input ports, 2 10/100BaseT interfaces and 6 serial ports; PowerQUICC II processor; 3 axis accelerometer; air-cooled and conduction-cooled formats available
PMCD3G	Multifunction PMC with Gigabit Ethernet, sync/async serial; air-cooled and conduction-cooled formats available

SERIAL IO

We offer a wide range of multi-channel serial interface boards for standard bus and expansion architectures such as CompactPCI, VMEbus, IndustryPack, PC•MIP, and PMC.

	Form Factor	Interface	Asynchronous	Synchronous	# Channels	Front I/O	Rear I/O
PMC-OCTPRO-232	PMC	RS232	■		8	■	■
P-SER	PMC	RS232/422/485	■		12	■	■
PMC-OCTPRO-422	PMC	EIA-422	■		8	■	■
PMC-HS-SERIAL (11050-201)	PMC	RS232/422/V.35	■	■	4	■	■
VME-6015	VME	RS232/422/485	■	■	4	■	
PMC-422/FP	PMC	RS232/422/485	■		8	■	■
PMC423	PMC	RS232/422/485	■		16	■	■
EPMCQ2	PMC	RS232/422/485	■	■	6	■	■
PMCQ1	PMC	RS232/422/485	■	■	4		■
PMC-422	PMC	RS232/422/485	■		8	■	■

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PACKET PROCESSORS

It is increasingly important for network administrators to control network traffic in order to maintain both security and quality of service. Packet processors provide secure, high-speed connectivity and complex security processing at wire speed performance. With our packet processors, you can quickly create applications such as Network Address Translators, Session Border Controllers, Media Gateways, Edge Routers, Firewall bricks and Video Services Switches that meet the demands of security conscious network administrators.

	Form Factor	Network Processor	Interconnect	DDR Packet Memory	Software Support
WANic 5434	PCI Express	OCTEON Plus CN5434LP-NSP	4x 1000BaseT	1 GB (DDR2)	Debian Linux, LSP, POST, UBoot
AT2-5800-10G	8U Single Slot ATCA	Dual OCTEON Plus CN5860-SCPs	10x 1000BaseT	Up to 16GB (DDR2) per processor	Carrier Grade Linux, LSP, POST, UBoot
WANic 56512	PCI Express	OCTEON Plus CN5650	2x 10Gb Ethernet	Up to 4GB (DDR2)	Debian Linux, LSP, POST, UBoot
Telum NPA-56512	AMC	OCTEON Plus CN5650	2x 10Gb Ethernet, PCI Express x8, 2x SATA	Up to 4GB (DDR2)	Debian Linux, LSP, POST, UBoot
WANic 6354	PCI Express	OCTEON II CN6335-AAP	4x 10/100/1000BaseT, 1000BaseSX or 1000BaseSX	4GB (DDR3)	Debian Linux, LSP, POST, UBoot
Telum NPA-5854	AMC	OCTEON Plus CN5850-SCP	4x1000BaseT or 4x1000BaseSX	Up to 2GB (DDR2)	Debian Linux, LSP, POST, UBoot
WANic 5860	PCI-X	OCTEON Plus CN5860-NSP	4x1000BaseT or 4x1000BaseSX	Up to 4GB (DDR2)	Debian Linux, LSP, POST, UBoot
WANic 5654	PCI Express	OCTEON Plus CN5650-NSP	4x1000BaseT or 4x1000BaseSX	Up to 4GB (DDR2)	Debian Linux, LSP, POST, UBoot

REFLECTIVE MEMORY NODES

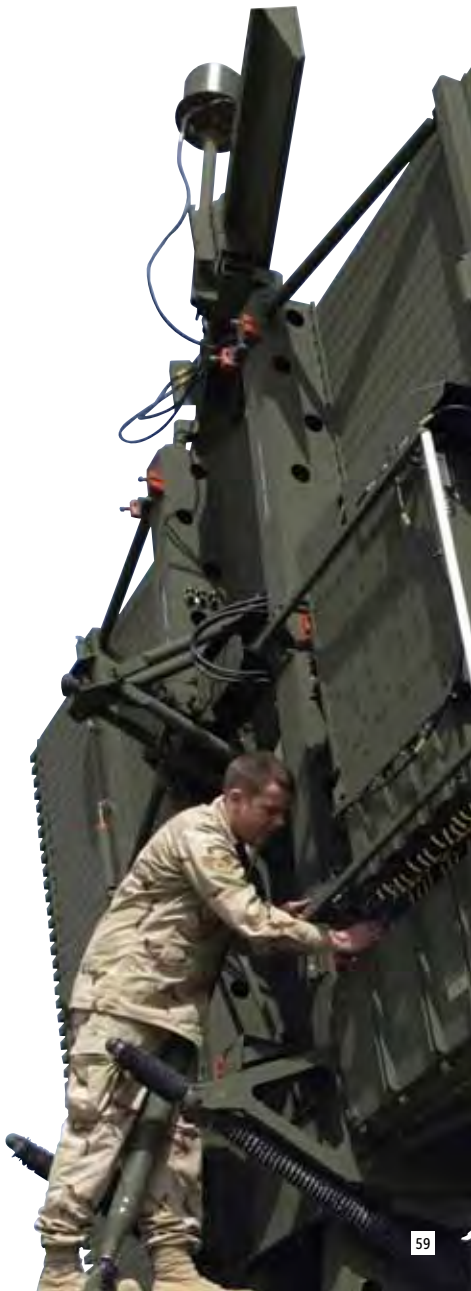
Reflective Memory networks are Real Time Local Area Networks in which each computer always has an up-to-date local copy of the shared memory set. These specialty networks are specifically designed to provide highly deterministic data communications. They deliver the tightly timed performance necessary for a variety of distributed simulation and industrial control applications. Reflective Memory networks have benefited from advances in general-purpose data networks, but they remain an entirely independent technology, driven by different requirements and catering to applications where determinism, implementation simplicity, and a lack of software overhead are key factors.

	Form Factor	Memory Capacity	Bit Rate (Gb/s)	Operating System (OS) Support
VME-5565	VME	128 MB	2	Linux, Solaris, VxWorks, Windows
PMC-5565PIORC	PMC	128 or 256 MB SDRAM	2	Linux, Solaris, VxWorks, Windows, Windows Server
PCI-5565PIORC	PCI	128 or 256 MB SDRAM	2	Linux, Solaris, VxWorks, Windows, Windows Server
PCIE-5565RC	PCI Express	128 or 256 MB SDRAM	2	Linux, Solaris, VxWorks, Windows, Windows Server
PCIE-5565PIORC	Low Profile PCI Express	128 or 256 MB SDRAM	2	Linux, VxWorks, Windows, Windows Server

REFLECTIVE MEMORY HUBS

Managed Reflective Memory hubs are designed to operate with our Reflective Memory real-time network products. Managed hubs provide a user interface using a standard HTML-based Web browser. The user interface presents status data such as loss of signal and synchronization information. Reflective Memory hubs are also able to automatically bypass ports if they detect a loss of signal or the loss of valid synchronization patterns, allowing the other nodes in the network to remain operational.

	Function	Ports	Other Ports	Options/ Notes
ACC-5595	Managed hub	8 (SFP connections)	1 RS-232; 1 10BaseT	19" 1U rackmount or desktop enclosure



STORAGE CONTROLLERS

Storage controllers that allow you to add SCSI capabilities to a single board computer or a system, and we continue to enhance our cards with features that meet a range of requirements.

	SCSI Interface	Form Factor	I/O Routing	RAID Support	Ruggedization	Description
PMC-USCSI320BP	Ultra320	PMC	Backplane	No	Commercial	High-Performance ULTRA320 SCSI PMC Controller with single channel interface and rear-panel I/O access. Conduction Cooled option: PMC-USCSI320BP-CC
PMC-USCSI320	Ultra320	PMC	Front panel	No	Commercial	PMC with ULTRA320 SCSI controller
PMC-5797	Ultra320	PMC	Front panel	Level 1 (IM)	Commercial	Single-channel PCI-X Ultra320 SCSI HBA; supports Integrated Mirroring is on Intel® x86 systems; supports RAID
PIM-USCSI3						PIM module for use with PMC-USCSI3BP and PMC-USCSI3CC

VMEBUS REPEATERS

Our bus repeaters extend a VMEbus backplane from one chassis to a second chassis. Both chassis operate as one unit, controlled by the system controller in the primary chassis.

	Link Cable	Distance	Data Transfers	Addressing	Multimaster (Multiple Masters in Either Chassis)	Interrupt Support	3U Slave Support
VME-5504L	Wire, Flat Cable	5 to 1,000 ft	8, 16, 32	16			
VME-5531L	Fiber Optic Cable	5 to 6,560 ft	8, 16, 32	16, 24, 32			■
VME-5532L	Fiber Optic Cable	5 to 6,560 ft	8, 16, 32	16, 24, 32	■		
VME-REPEAT-A-L	Wire, Flat Cable	5 to 50 ft	8, 16, 32	16, 24, 32		■	
VME-REPEATL-485	Wire, Flat Cable	5 to 2,000 ft	8, 16	16, 24		■	

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Reflective Memory

GE Intelligent Platforms has an impressive array of reflective memory products designed to fit into existing military and aerospace environments.

With node interface cards that can be installed in a variety of computer backplanes and buses including VME, PMC, PCI and PCI Express (PCIe) as well as support for a range of operating systems such as Linux®, VxWorks®, Microsoft® Windows® XP/Vista®/2003 and Solaris®, GE Intelligent Platforms has an impressive array of reflective memory products designed to fit into existing military and aerospace environments. We offer the choice between multi-mode for short fiber runs or single-node for spanning long distances between nodes for the fiber optic cable interconnect. Our newly refreshed software tools ease migration from older reflective memory products to newer ones that are fuller-featured and offer higher performance.

Our latest offering is the PCIE-5565 PIORC low-profile PCIe reflective memory node card. This high-speed, low-latency, deterministic interface allows data to be shared between as many as 256 independent nodes at up to 170 MB/s. Each board may be configured with 128 or 256 MB of onboard SDRAM. The local SDRAM provides fast Read access times to stored data, while writes are stored in local SDRAM and broadcast over a high-speed fiber optic data path to other nodes.

No I/O overhead is required, as the transfer of data between nodes is software-transparent. Transmit and receive FIFOs buffer data during peak data rates, thus optimizing the host computer and bus performance to maintain high data throughput. PCIE-5565PIORC is RoHS compliant, and has improved PIO read performance and firmware that can be upgraded in the field.

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PRODUCT LIFECYCLE MANAGEMENT

Major military and aerospace assets are not commodity items that can be sent to the scrap heap whenever the next generation of technology is rolled out.

Rather, the lifecycles of these assets are often expected to be deployable for several years and even decades. A well-engineered system or subsystem design can go a long way to helping a platform achieve the required lifecycle, but effective Product Lifecycle Management (PLM) can help ensure that parts are available to service routine or emergency maintenance. Equally important, a PLM program can anticipate technology advances and allow for upgrades to embedded technology with a minimum of hardware or software disruption. The end result is the highest level of repeatable performance coupled with the lowest possible cost of ownership across the lifecycle of a given platform.

GE Intelligent Platforms has military and aerospace PLM expertise that few, if any, other companies can match. PLM has been a core tenet of GE for decades. GE's long-established PLM team maintains close contact with component suppliers and industry groups such as the Component Obsolescence Group to constantly monitor technology developments and component obsolescence issues. At the heart of the program is a dedication to providing both progressive and defensive Long Term Support.

Progressive support begins on the design table, with embedded products being designed for maximum compatibility or upgradability even before they are qualified for a system. The list of critical components will include only those elements for which vendors have committed to a long-term production run.

After a product is launched, defensive PLM provides the technical support and service to keep the product running, as well as ensuring that sufficient stores of spare parts are available to avoid the premature shutdown of a system or even the entire platform. When technology obsolescence occurs in the marketplace, GE's Health Check program will alert the customer and provide possible solutions such as a last-time buy of the components, an appropriate replacement component, a redesign of the original product for form, fit, or function compatibility, technology insertion earlier than planned or a lifetime purchase of the components. When components are purchased in bulk, GE also can provide secure, climate-controlled storage for as long as required by the customer.

Long-term product lifecycles demand that critical engineering knowledge is available regardless of personnel changes or corporate restructures. Similarly, testing, diagnostic and repair capabilities must be maintained. GE Intelligent Platforms' PLM program ensures that such knowledge, protocols and capabilities are available throughout the lifecycle of the platform.

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